

˘ Husbandry Guidelines



for

Princess Parrot

Polytelis alexandrae

(Aves : Psittacidae)

Compiled by: Ms Sally Anne Flew

Date of Preparation: 2009-10

Western Sydney Institute of TAFE, Richmond

Certificate 3 Captive Animals RUV 30204

Lecturer: Graeme Phipps, Jackie Salkeld, Brad Walker.

TABLE OF CONTENTS

1	INTRODUCTION.....	ERROR! BOOKMARK NOT DEFINED.
2	TAXONOMY	ERROR! BOOKMARK NOT DEFINED.
2.1	NOMENCLATURE.....	ERROR! BOOKMARK NOT DEFINED.
2.2	SUBSPECIES	ERROR! BOOKMARK NOT DEFINED.
2.3	RECENT SYNONYMS	ERROR! BOOKMARK NOT DEFINED.
2.4	OTHER COMMON NAMES	ERROR! BOOKMARK NOT DEFINED.
3	NATURAL HISTORY	ERROR! BOOKMARK NOT DEFINED.
3.1	MORPHOMETRICS.....	ERROR! BOOKMARK NOT DEFINED.
3.1.1	<i>Mass And Basic Body Measurements</i>	<i>Error! Bookmark not defined.</i>
3.1.2	<i>Sexual Dimorphism.....</i>	<i>Error! Bookmark not defined.</i>
3.1.3	<i>Distinguishing Features.....</i>	<i>Error! Bookmark not defined.</i>
3.2	DISTRIBUTION AND HABITAT	ERROR! BOOKMARK NOT DEFINED.
3.3	CONSERVATION STATUS	ERROR! BOOKMARK NOT DEFINED.
3.4	LONGEVITY	ERROR! BOOKMARK NOT DEFINED.
3.4.1	<i>In the Wild</i>	<i>Error! Bookmark not defined.</i>
3.4.2	<i>In Captivity</i>	<i>Error! Bookmark not defined.</i>
3.4.3	<i>Techniques Used to Determine Age in Adults.....</i>	<i>Error! Bookmark not defined.</i>
4	HOUSING REQUIREMENTS	ERROR! BOOKMARK NOT DEFINED.
4.1	EXHIBIT/ENCLOSURE DESIGN	ERROR! BOOKMARK NOT DEFINED.
4.2	HOLDING AREA DESIGN	ERROR! BOOKMARK NOT DEFINED.
4.3	SPATIAL REQUIREMENTS	ERROR! BOOKMARK NOT DEFINED.
4.4	POSITION OF ENCLOSURES	ERROR! BOOKMARK NOT DEFINED.
4.5	WEATHER PROTECTION.....	ERROR! BOOKMARK NOT DEFINED.
4.6	TEMPERATURE REQUIREMENTS	ERROR! BOOKMARK NOT DEFINED.
4.7	SUBSTRATE	ERROR! BOOKMARK NOT DEFINED.
4.8	NESTBOXES AND/OR BEDDING MATERIAL	ERROR! BOOKMARK NOT DEFINED.
4.9	ENCLOSURE FURNISHINGS	ERROR! BOOKMARK NOT DEFINED.
5	GENERAL HUSBANDRY.....	ERROR! BOOKMARK NOT DEFINED.
5.1	HYGIENE AND CLEANING	ERROR! BOOKMARK NOT DEFINED.
5.2	RECORD KEEPING	ERROR! BOOKMARK NOT DEFINED.
5.3	METHODS OF IDENTIFICATION	ERROR! BOOKMARK NOT DEFINED.
5.4	ROUTINE DATA COLLECTION.....	ERROR! BOOKMARK NOT DEFINED.
6	FEEDING REQUIREMENTS.....	ERROR! BOOKMARK NOT DEFINED.
6.1	DIET IN THE WILD	ERROR! BOOKMARK NOT DEFINED.
6.2	CAPTIVE DIET	ERROR! BOOKMARK NOT DEFINED.
6.3	SUPPLEMENTS	ERROR! BOOKMARK NOT DEFINED.
6.4	PRESENTATION OF FOOD	ERROR! BOOKMARK NOT DEFINED.
7	HANDLING AND TRANSPORT	ERROR! BOOKMARK NOT DEFINED.
7.1	TIMING OF CAPTURE AND HANDLING	ERROR! BOOKMARK NOT DEFINED.
7.2	CATCHING BAGS	ERROR! BOOKMARK NOT DEFINED.
7.3	CAPTURE AND RESTRAINT TECHNIQUES	ERROR! BOOKMARK NOT DEFINED.
7.4	WEIGHING AND EXAMINATION	ERROR! BOOKMARK NOT DEFINED.
7.5	RELEASE	ERROR! BOOKMARK NOT DEFINED.
7.6	TRANSPORT REQUIREMENTS	ERROR! BOOKMARK NOT DEFINED.
7.6.1	<i>Box Design.....</i>	<i>Error! Bookmark not defined.</i>
7.6.2	<i>Furnishings.....</i>	<i>Error! Bookmark not defined.</i>
7.6.3	<i>Water and Food.....</i>	<i>Error! Bookmark not defined.</i>
7.6.4	<i>Animals per Box.....</i>	<i>Error! Bookmark not defined.</i>
7.6.5	<i>Timing of Transportation.....</i>	<i>Error! Bookmark not defined.</i>
7.6.6	<i>Release from Box.....</i>	<i>Error! Bookmark not defined.</i>

8	HEALTH REQUIREMENTS.....	ERROR! BOOKMARK NOT DEFINED.
8.1	DAILY HEALTH CHECKS	ERROR! BOOKMARK NOT DEFINED.
8.2	DETAILED PHYSICAL EXAMINATION	ERROR! BOOKMARK NOT DEFINED.
8.2.1	Chemical Restraint	<i>Error! Bookmark not defined.</i>
8.2.2	Physical Examination	<i>Error! Bookmark not defined.</i>
8.3	ROUTINE TREATMENTS	ERROR! BOOKMARK NOT DEFINED.
8.4	KNOWN HEALTH PROBLEMS	ERROR! BOOKMARK NOT DEFINED.
8.5	QUARANTINE REQUIREMENTS.....	ERROR! BOOKMARK NOT DEFINED.
9	BEHAVIOUR.....	ERROR! BOOKMARK NOT DEFINED.
9.1	ACTIVITY	50
9.2	SOCIAL BEHAVIOUR.....	ERROR! BOOKMARK NOT DEFINED.
9.3	REPRODUCTIVE BEHAVIOUR	51
9.4	BATHING	52
9.5	BEHAVIOURAL PROBLEMS	52
9.6	SIGNS OF STRESS.....	ERROR! BOOKMARK NOT DEFINED.
9.7	BEHAVIOURAL ENRICHMENT	52
9.8	INTRODUCTIONS AND REMOVALS	ERROR! BOOKMARK NOT DEFINED.
9.9	INTRASPECIFIC COMPATIBILITY	ERROR! BOOKMARK NOT DEFINED.
9.10	INTERSPECIFIC COMPATIBILITY.....	ERROR! BOOKMARK NOT DEFINED.
9.11	SUITABILITY TO CAPTIVITY.....	ERROR! BOOKMARK NOT DEFINED.
10	BREEDING	ERROR! BOOKMARK NOT DEFINED.
10.1	MATING SYSTEM.....	ERROR! BOOKMARK NOT DEFINED.
10.2	EASE OF BREEDING	ERROR! BOOKMARK NOT DEFINED.
10.3	REPRODUCTIVE CONDITION	ERROR! BOOKMARK NOT DEFINED.
10.3.1	Females.....	<i>Error! Bookmark not defined.</i>
10.3.2	Males.....	<i>Error! Bookmark not defined.</i>
10.4	TECHNIQUES USED TO CONTROL BREEDING	ERROR! BOOKMARK NOT DEFINED.
10.5	OCCURRENCE OF HYBRIDS	ERROR! BOOKMARK NOT DEFINED.
10.6	TIMING OF BREEDING.....	ERROR! BOOKMARK NOT DEFINED.
10.7	AGE AT FIRST BREEDING AND LAST BREEDING	ERROR! BOOKMARK NOT DEFINED.
10.8	ABILITY TO BREED EVERY YEAR	ERROR! BOOKMARK NOT DEFINED.
10.9	ABILITY TO BREED MORE THAN ONCE PER YEAR	ERROR! BOOKMARK NOT DEFINED.
10.10	NESTING, HOLLOW OR OTHER REQUIREMENTS.....	ERROR! BOOKMARK NOT DEFINED.
10.11	BREEDING DIET.....	ERROR! BOOKMARK NOT DEFINED.
10.12	INCUBATION PERIOD	ERROR! BOOKMARK NOT DEFINED.
10.13	CLUTCH SIZE.....	ERROR! BOOKMARK NOT DEFINED.
10.14	AGE AT FLEDGING.....	ERROR! BOOKMARK NOT DEFINED.
10.15	AGE OF REMOVAL FROM PARENTS.....	ERROR! BOOKMARK NOT DEFINED.
10.16	GROWTH AND DEVELOPMENT	ERROR! BOOKMARK NOT DEFINED.
11	ARTIFICIAL REARING.....	ERROR! BOOKMARK NOT DEFINED.
11.1	INCUBATOR TYPE.....	ERROR! BOOKMARK NOT DEFINED.
11.2	INCUBATION TEMPERATURES AND HUMIDITY.....	ERROR! BOOKMARK NOT DEFINED.
11.3	DESIRED % EGG MASS LOSS	ERROR! BOOKMARK NOT DEFINED.
11.4	HATCHING TEMPERATURE AND HUMIDITY	ERROR! BOOKMARK NOT DEFINED.
11.5	NORMAL PIP TO HATCH INTERVAL	ERROR! BOOKMARK NOT DEFINED.
11.6	BROODER TYPES/DESIGN.....	ERROR! BOOKMARK NOT DEFINED.
11.7	BROODER TEMPERATURES	ERROR! BOOKMARK NOT DEFINED.
11.8	DIET AND FEEDING ROUTINE	ERROR! BOOKMARK NOT DEFINED.
11.9	SPECIFIC REQUIREMENTS	ERROR! BOOKMARK NOT DEFINED.
11.10	PINIONING REQUIREMENTS	ERROR! BOOKMARK NOT DEFINED.
11.11	DATA RECORDING.....	ERROR! BOOKMARK NOT DEFINED.
11.12	IDENTIFICATION METHODS	ERROR! BOOKMARK NOT DEFINED.
11.13	HYGIENE	ERROR! BOOKMARK NOT DEFINED.
11.14	BEHAVIOURAL CONSIDERATIONS.....	ERROR! BOOKMARK NOT DEFINED.
11.15	USE OF FOSTER SPECIES	ERROR! BOOKMARK NOT DEFINED.
11.16	WEANING	ERROR! BOOKMARK NOT DEFINED.
11.17	REHABILITATION PROCEDURES.....	ERROR! BOOKMARK NOT DEFINED.

12	ACKNOWLEDGEMENTS.....	ERROR! BOOKMARK NOT DEFINED.
13	REFERENCES.....	ERROR! BOOKMARK NOT DEFINED.
14	BIBLIOGRAPHY	ERROR! BOOKMARK NOT DEFINED.
15	GLOSSARY	ERROR! BOOKMARK NOT DEFINED.
16	APPENDIX.....	ERROR! BOOKMARK NOT DEFINED.

Occupational Health and Safety Risks

Basic precautions to avoid bird related diseases:

- Always wash your hands thoroughly before and after handling birds or cleaning cages and aviaries.
- Avoid close contact with any bird unless it appears healthy or has been through a quarantine period before introduction to a bird collection.
- Wear gloves if handling dead birds.
- Wet clean to minimise dust inhalation where possible to prevent diseases of a zoonotic nature such as Aspergillus and Psittacosis.
- Control mites, lice and other insects with pest strips or safe insecticides.
- Clean aviaries regularly and do not allow dust and droppings to build up.
- Always wear a face mask, apron and gloves when cleaning out cages, nest boxes and aviaries, especially if they have not been cleaned on a regular basis.
- Quarantine all birds before introducing new birds to the collection.
- Wear a hat and sunscreen for sun protection in summer.
- If you become sick, particularly with influenza like symptoms, allergies, or contract respiratory problems, see your doctor as soon as possible.
- Tetanus vaccinations should be current.
- Use good hygiene when preparing food for animals.
- If you are cleaning cages of birds with suspected Psittacosis, a face mask and gloves is recommended. Use damp cleaning techniques and Halamid.
- The clinical signs of Psittacosis in humans are a severe flu that hangs around; fever, headaches, photophobia, flu and may progress to pneumonia.
- Aspergillus can also be transmitted to humans; therefore good ventilation is required to prevent this respiratory disease.
- The most common problem is injuries from claws and beaks. If the skin is broken wash immediately and disinfect with antiseptic cream.
- Any redness, puffiness or streaks up your arm indicate an infection and prompt medical treatment should be sought.

\



1. INTRODUCTION

Polytelis is an Australian genus with three recognised species; the Superb Parrot *P. swainsonii*, the Regent Parrot *P. anthopeplus* and Princess Parrot *P. alexandrae*. Unfortunately the *Polytelis* genus has suffered dramatically since European settlement in Australia due to the clearing of land for agricultural purposes.

The elegance, subtle beauty and placid temperament of the Princess Parrot make these birds ideal avicultural subjects. The occurrence of many beautiful colour mutations in this species has resulted in great interest in this group.

In Australia these species are popular and successful aviary parrots. They are inexpensive and readily available. Their long, slender, elegant form and soft pastel colours makes these birds serenely beautiful.

(Sindel & Gill, 2003)



2. TAXONOMY

○ 2.1 Nomenclature

Kingdom: Animalia

Phylum: Chordata

Class: Aves

Order: Psittaciformes

Family: Psittacidae

Tribe: Polytelini

Genus: *Polytelis*

Species: *P. alexandrae*

Binomial name: *Polytelis alexandrae*

○ 2.2 Subspecies

No recognised subspecies.

○ 2.3 Recent Synonyms

None known

○ 2.4 Other common Names:

Alexandra's Parrot; Rose Throated Parrot; Princess Alexandra's Parrot;
Prince of Wales Parrot; Rose Throated Parakeet; Queen Alexandra's Parrot,
Queen Alexandra's Parakeet; Spinnifex Parrot.

(Pizzey, G & Knight, F 1997) (Moorecombe, M 2003) (Simpson, K & Day, N. 2003)
(Parish, S. 2008) (Cayley, N 1969)



Fig 1 Princess Parrot pair *P alexandrae* male on right, female on left.
(Sindel & Gill.2003)



3. NATURAL HISTORY

- This species was first discovered in 1862 by the Stuart Exploratory Expedition into central Australia at Howell's Pond (latitude 16.54° South)
- This newly discovered species was named by John Guild as *Polytelis alexandrae* in the Proceedings of the Zoological Society in London, 1863.
- *Polytelis* which means magnificent in Greek; *alexandrae* in honour of the then Princess of Wales; Princess Alexandra Caroline Mary Charlotte Louisa Julia (1844-1925) a Danish Princess who, when she married Edward later became King Edward VII, became the Queen of England (1863)
- These birds were once treated as 'rare fauna' in aviaries, but have become readily available as a result of persistence and dedication by breeders.
- Through the period of restricted access and the need for special permits to the present time when following the 1988 breeding season there were in excess of 12,000 Princess Parrots held in south Australian aviaries.
(Hocking, K 1990)(Higgins, PJ 1999)

○ 3.1 Morphometrics

• 3.1.1. Mass and Basic Body Measurements:

- Head –body length: males-46cm; females-35cm; average length: 43cm
Total length: 38cm
- Weight: 90-120gm; average weight: 105gm (Sindel & Gill, 2003)

• 3.1.1 Sexual Dimorphism:

- Males: Crown is bright blue and sides of head are pastel blue; upper parts and flight feathers are olive, except for violet/blue rump; light green shoulder and purple greater coverts; cheek and throat rose/pink; breast yellow/grey; abdomen pink/mauve; bill is coral/red.(see Fig 1)
- Females: grey/blue rump; head slatey blue; bill is wine coloured.
Female and juvenile have a much shorter tail.

• 3.1.2 Distinguishing Features

- Colouration: male iris is orange and female iris is brown.
- Physical characteristics: Mature males develop a longer spatula which is an extension from the end of the 3rd primary feather on each side; this is clearly visible when the wings are folded.
- Female /juvenile birds are duller and have shorter tail feathers.
- Adult birds have orange to red/pink bills and bright orange/red irides and grey legs.
(Sindel & Gill,2003)



Fig 2 Females are as delicately coloured as the males, but with shades of mauve where the male has blue Photo S Parish

○ 3.2 Distribution and Habitat

- These parrots are highly nomadic, moving from area to area following food. Uncommon in the interior of Australia, these parrots occur in the arid regions of Western Australia, Northern Territory and South Australia.
- Has been recorded with low numbers in the Great Sandy, Gibson, Tanami and Great Victoria Deserts.
- Their range includes numerous mountain ranges, undulating hilly areas, sand dunes and ridges and gibber plains as well as arid shrub lands and savannah woodlands. Habitat species include: *Mulga*, *Eucalypts*, *Casuarinas*, *Acacias*, *Desert Oaks*, *Hakeas*, *Mistletoes*, *Spinnifex* country.
- Also occurs and breeds in vegetated riverine and littoral areas. It has been theorised that movements are directed by seasonal changes in conditions and the abundance of food. There has not been to date any methodical survey for this species to determine its distribution accurately.
- With reference to the distribution map (Fig 4) it may indicate large numbers in a large range but this is not the case.
- Due to their scarcity and nomadic habits, the lack of human inhabitants in most of their range, it is not possible to draw definite lines upon a map and state that this is where these birds are only to be found.

- These birds have the ability to travel long distances very quickly, therefore they may appear in places where they are not expected to inhabit.



Fig 3 A stand of Desert Oak, *Casuarina decaisneana*, with Spinifex ground cover often associated with Princess Parrot sightings. (Sindel & Gill, 2003)

- It is not unusual for the birds to not have been seen for up to 40 years or more, and to suddenly appear when conditions are favourable to nest and, once the young have fledged, to depart as suddenly as they came.

Status: vulnerable.

(Burbidge, 2006) (Blaker, 1984: Carter, 1993: Johnson & Storr, 1998: Higgins, 1999: Baxter & Henderson, 2000; Forshaw, J, 2002; Barrett, 2003) (Hutchins & Lovell, 1985)



Fig 4 Distribution map in Australia (Sindel & Gill, 2003)

- The Australian Natural Resources Atlas conducted a Biodiversity Assessment in 2007 in the Finke Desert and this species was identified as being 'at risk'

The threatening processes were identified as follows:

- 1) Changed fire regimes resulting in a reduction in the quality of habitat due to the increased incidence of extensive hot fires.
- 2) Feral animals causing a reduction in quality of habitat due to grazing of sheep, rabbits, camels and donkeys.
- 3) Grazing pressure has likely caused a reduction in habitat quality through vegetation change as a result of clearing and pastoralism.

(Hocking, K 1990)(www.environment.gov.nsw.au)



Fig 5 Desert regions of Central Australia where these birds have been known to range in the wild.

- **3.4 Longevity**
- **3.4.1 In the Wild**
In excess of 25 years
- **3.4.2 In Captivity**
Up to 30 years.
- **3.4.3 Techniques used to Determine Age in Adults**
- Plumage colouration and bill colouration.
Female and juvenile birds are duller and have shorter tail feathers.
Adult birds have orange to red/pink bills and bright orange/red irides and grey legs.
- Can also tell age by differences in bare parts; bill - duller orange, grading to brown at base; iris – red – brown; legs and feet – dull pink.
- In the young chicks develop the cock birds reveal themselves by trying to whistle and perform at an early age. It is best to note the sex differences at this stage as soon it will be impossible to tell them apart.
- At approximately 9 -12 days old, close rings can be applied to the legs. As the chicks fledge further observations can be made to determine sex and you may separate them from this age.

(Sindel & Gill, 2003) (Higgins PJ 1999)(Hocking,K1990)



4. HOUSING REQUIREMENTS

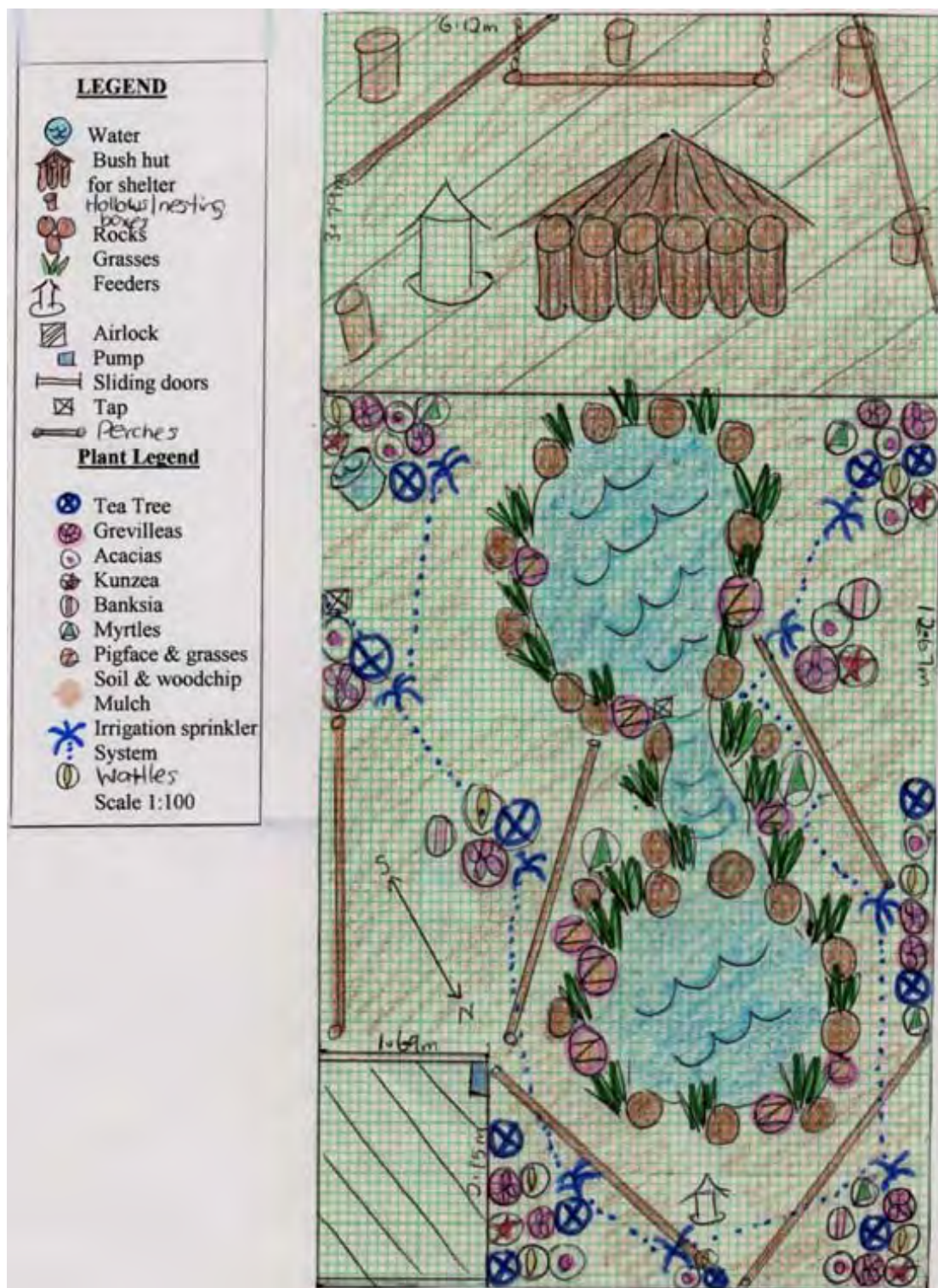


Fig 6 Mixed Species Flight Aviary Wirrimbirra Flora and Fauna Sanctuary Bargo NSW

○ 4.1 Exhibit/Enclosure Design

- Above is an example of an exhibit design for a mixed species exhibit within a large flight aviary which includes Princess Parrots.
- The exhibit must have adequate branches to enable the birds to fly from end to end thus exercising their wings.
- The exhibit must have adequate feeding stations.
- The exhibit must have a hide to enable the birds to get away from each other and from the viewing public if they desire.
- In rural areas of Australia aviculturists will be troubled by snakes in the aviary at some time. Snakes can squeeze through the tiniest crack, gain access via rodent holes, get through 12mm wire mesh and scale vertical walls where the slightest protrusion may help their climb.
- Smooth surfaced metal sheeting fitted around the lower section of the aviary to a height of 1.2m helps to exclude snakes, as does removal of all vegetation adjacent to or overhanging the aviary.
- Extreme summer temperatures often experienced throughout Australia can cause discomfort for Princess Parrots and when temperatures exceed 35degC deaths may occur in adult birds as well as losses of nestlings unless cooling measures are taken.
- Soaker hoses or mist sprinklers can be easily installed cheaply and effectively on top of aviaries.



Fig 7 Flight aviary Wirrimbirra Flora and Fauna Sanctuary Photo S Flew
This is a large mixed species exhibit.



Fig 8 Fully roofed aviary block with rear service corridor and front corridor or planted area for protection. (Sindel & Gill, 2003)

○ **4.2 Holding Area Design**

When there is a need to remove a bird from display for a number of reasons, an appropriate holding enclosure is required.

- For health and quarantine, Social restraints; Pre-departure; Reproduction and Additional housing.
- The birds must be able to stand up, move around and stretch their wings comfortably.
- Must be more than three times the birds' length and breadth.
- Must provide protection from the weather, adequate ventilation, and have good drainage.
- Must be secure, have padlocks on the gates, and have safe access for keepers.
- Must be kept clean and in good repair.

EAPA standards from(www.dpi.gov.nsw.au)ARAZPA standards



Fig 9 Cage cards for a mixed species exhibit Photo S Flew

○ **4.3 Spatial Requirements**

- Don't overcrowd the enclosure as this leads to stress and can increase the chance of disease.
- Aviaries ranging in size from 4m to 6m in length, and 90cm to 1.2m wide and approx 2m high, meet the requirements for this species.
- Double-gated airlock is required to allow safe access for keepers. Must be designed to minimise escape. Must be large enough to allow a wheelbarrow access for cleaning.
- Psychological and physiological needs must be fulfilled.
- Size and shape of enclosure must provide freedom of movement both horizontally and vertically.
- Doors or gates must (if hinged) open inwards towards the enclosure.

EAPA general standards for exhibiting animals in NSW (www.dpi.gov.nsw.au)

○ **4.4 Position of Enclosures**

Aviaries should have a Northerly aspect. There should be an enclosed section providing shelter from the direction from which the bad weather usually comes from.

○ **4.5 Weather Protection**

- Need to provide protection from the elements such as rain, hail, wind and heat.
- A roofed section with covered walls can provide a semi-enclosed area for the birds to seek to give protection from extremes of weather conditions and access shade in hot weather.
- The use of soaker hoses or sprinkler systems can also give relief in warmer climates.

These Parrots are able to tolerate reasonable temperatures, although in cooler climates (<10°C) hollows or nesting boxes can provide warmth and shelter from the cold.

(www.worldparrottrust.com)



Fig 10 Under cover section provides shelter from the weather Photo S Flew

○ **4.6 Heating Requirements**

- The hens incubate their eggs in October; have young in the nest during November, and the chicks leave the nest around the middle of December. Therefore as breeding occurs during the warmer months of the year no additional heating is required.
- Lined nesting boxes or hollows will provide adequate warmth as long as they are located under the covered section of the aviary.
(www.parrotsociety.org.au)

○ **4.7 Substrate**

- The most commonly encountered floors are natural earth, sand filled, pebble and concrete.

- Natural earth floors provide an aesthetically pleasing appearance in large planted aviaries, although birds housed with this type of floor are often infested with worms.
- Bacteria thrive in damp conditions, leaving the birds vulnerable to infections, while rodent infestation is also a common problem.
- May be a planted aviary with a natural substrate such as *Tea Tree* or *Eucalyptus* woodchips.(Fig14,16) This can be hosed and raked over regularly and replaced as required.
- Sand floors also appear aesthetically pleasing and are reasonably easy to clean by removing faecal matter and spoiled food from the surface.(Fig 11)
- The replacement of the top 10cm of sand every 6 months is important as, if the sand is allowed to remain in the aviary for long periods; it will become polluted with dust, faecal matter, food and seed husks, etc.
- Birds on sand floors also require regular worming.



Fig 11 Natural earth floors soon become polluted and unhygienic Photo S Flew

- Drainage is essential either in the form of sub-surface agricultural drainage (see Fig 10) or by elevating the floor level to at least 10cm above the surrounding ground level and providing suitable seepage weep holes.
- Pebble floors also provide an aesthetically pleasing substrate, will also require efficient sub-surface drainage, and may be cleaned easily with high pressure hoses.(Fig 10)
- If pebble floors are not provided with an efficient drainage system, the surface can become difficult to clean and silting up is inevitable.
- Even well drained pebble floors can silt up after several years of use, therefore the removal and washing or renewal of the pebbles is essential.

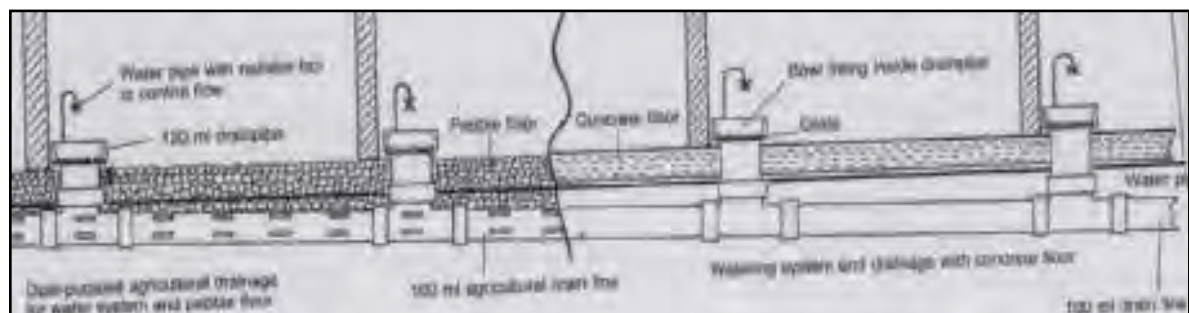


Fig12 Sub-surface drainage system

- Concrete floors are easy to clean and maintain, and are by far the most functional type of floor.
- Cleaning of concrete can be simplified by covering with a layer of sand which helps to prevent faecal matter and food from sticking to the surface.
- Using a broom and shovel is all that is required to remove the bulk of waste material.
- Floors with suitable drainage may be cleaned with a high pressure water hose.
- Concrete floors also help to eliminate vermin such as rats and mice, as well as helping to control infestation of worms, although regular worming is still advisable.
- May cover concrete with a layer of substrate material such as sand or rice husks for insulation and drainage. Will require removal and renewal regularly.



Fig 13 Pebble floors can be hosed or water blasted Photo S Flew



Fig 14 Sand floors with concreted pond Photo S Flew



Fig 15 Suspended feeder with roof to protect the food from rain Photo S Flew

○ **4.8 Nest Boxes or Bedding material**

- Timber is the most suitable material for nest boxes, either hollow logs or boxes constructed with sawn timber.
- These must be maintained and thoroughly cleaned between breeding seasons.
- Bedding materials such as shredded paper or sawdust are all adequate, providing warmth and comfort. This substrate must be changed regularly to prevent the build up of faecal matter in the nest.
- Size of box must be around 65cm deep x 18cm square, with an entrance hole 65cm in diameter and at an angle of 45deg.



Fig16 Suspended automatic feeder Photo S Flew

○ **4.9 Enclosure furnishings**

- Timber branches of various thicknesses for perches allow the birds to exercise their feet.
- Multiple perches of various sizes to enable birds' free flight and exercise.
- Furniture must encourage normal behaviour, whilst resembling the birds' natural habitat, providing an interesting exhibit and giving the viewing public an understanding and example of the birds' natural environment.

- Browse can be added for aesthetic purposes as well as providing food and enrichment. This needs to be replaced regularly.
- If a planted-out aviary is available the birds will not destroy all the vegetation within. Small flowering shrubs such as *Acacia* and *Grevillea* can be planted in the aviary and will provide food as well as shelter for birds.(see section 6)
- A cemented-in pond can provide drinking water as well as water for bathing; this must be easily emptied and scrubbed out to prevent build up of bacteria.
- Planted-out tussocks of grass provide foliage to the aviary for enrichment, provide nest building materials and give a natural look, which is aesthetically pleasing for the viewing public.
- Feeding and watering facilities must be positioned to avoid contamination from birds' faecal matter and be protected from rain, direct sunlight and vermin.
- Food containers can be suspended from the ceiling to prevent access from rats and mice. (see Fig 12,13)



Fig 17 Planted out aviaries provide a suitable habitat. Photo S Flew



Fig 18 Established trees provide shade and shelter Photo S Flew



Fig 19 A concreted pond is an aesthetically pleasing way to provide bathing and drinking water Photo S Flew

➤ 5. GENERAL HUSBANDRY

○ 5.1 Hygiene and Cleaning

Good hygiene does not eliminate bacteria and produce sterile surroundings, but it does keep their numbers in check so that a bird's defences are not overwhelmed by microbes.

The most important aspect of captive management of all animals must be cleanliness if healthy, parasite-free animals are to be maintained.

- Aviary must be kept clean at all times. It's important for the birds' health and welfare, as well as for the viewing public to see the enclosures are maintained properly and the birds are looked after well.
- Aviary must be raked over daily if floor is covered with substrate such as sand or sawdust, and all uneaten and spoiled food and faecal matter must be removed.
- It is important to remember to remove any wilted green food. Unconsumed fruit or soaked seed must be removed from the aviary the next day, as, if this is not done, these may be the potential cause of bacterial infections in the collection.
- Regular washing or scrubbing of floors, walls, wire mesh, perches, food and water containers with a Chlorhexidine based disinfectant-detergent will assist in controlling disease outbreaks.(see Appendix)
- At least monthly, depending on the size of enclosure and number of birds housed, the substrate must be removed and floor hosed and disinfected, then let dry and clean substrate spread onto the floor.
- If the floor is bare concrete, then the floor must be swept and scrubbed with water and a broom to remove all faecal matter and debris daily.
- Nest boxes must be emptied and disinfected and clean bedding introduced prior to each breeding season.
- Ensure you rinse well with lots of water and allow the aviary to dry out before replacing any substrate onto the floor.
- The removal of all feeders containing seed from the enclosure each afternoon helps to reduce the possibility of rodents and ants in the aviary.

- Other pest control measures include Elliot traps and the use of Racumin rat baits. (see Appendix section for MSDS)
- All feeding containers must be emptied and cleaned at least weekly, as stale food and dusty, mouldy or fouled seed can promote fungal or bacterial infections.
- Tools and equipment used in the aviary must be well maintained and kept in a safe and tidy manner at all times.
- Ensure adequate Personal Protective Equipment is used to prevent Psittacosis which is a zoonotic disease. Wear face masks. Wet clean to minimize dust inhalation by keepers and birds. Wear gloves.
- Ensure all equipment and tools are put away and stored correctly.
- Old branches need to be burnt or disposed of correctly to prevent the spread of disease.
- Remove all substrate from floor. Rake up and put into wheelbarrow. Dispose of correctly to prevent spread of disease.
- Perches should be positioned at the extremities of the aviary to provide maximum flying space and must be placed to avoid the fouling of walls, food and water containers. (Sindel & Gill, 2003)(Hocking, K 1990)

Cleaning regime for the aviary

DAILY	WEEKLY	MONTHLY	6-MONTHLY	ANNUALLY
Remove all uneaten fruit & vegetables	Scrub all branches with soap & water	Fertilise all plants	Remove & replace all branches	Change all furniture around
Check water and empty & clean if required	Rake substrate & Remove all faecal matter	Prune any overgrown plants as required	Drain & clean pond and refill	Remove all substrate & replace with fresh
Remove & replace browse if required	Water all plants especially in summer months	Empty and clean all feeders to remove old/mouldy seed	Replace any damaged plants	Remove & clean all nesting boxes & hollows prior to breeding season
Rake over floor if covered with substrate	Ensure there is adequate shell grit & replace if required	Mulch plants as required	Top up substrate as required	Check all perimeter walls & roof for repairs & carry out as necessary
Top up water if necessary (summer)	Remove and replace browse	Sweep & scrub, hose airlock floor	Maintain pump as required	Check all gates for maintenance & repairs
	Empty ,clean & refill browse pots	Clean out pump filter	Scrub all interior walls with soap & water	
	If floor is concrete sweep & hose out	Remove any faecal matter within the aviary		



Fig 20 Cleaning equipment must be stored neatly Photo S Flew

○ **5.2 Record Keeping**

- Age, health condition, reproductive status, vaccination information, external and internal parasite treatment and weights must be recorded for each bird on the appropriate record form.
- The practice of observing all birds in your collection at least once a day is advisable. Any bird which appears inactive, listless or dull in the eye should be caught and examined.
- Each bird must have its own record card which must be kept up to date with all the relevant information relating to that individual animal. These can be accessed by the keepers when required.
- Any changes in behaviour of medication administered must be up dated on the relevant birds' card.

○ **5.3 Methods of Identification**

See Section 11.12

- Leg Banding is the accepted method of identification for this species.
To close ring a young bird requires that you inspect the nest every day.
- The correct size ring is 'P' these are numbered and come in a variety of colours. Can be personalised with you initials or any other code at no extra cost.
- Holding the nestling in the palm of your hand, slip the ring over the three toes at the same time and slide it over the 'wrist' and up the leg.
- You may find that the small back toe is now held inside the leg band, to release this the quill of a feather can be used to slide between the leg and the toe beneath the ring, and release the small toe without injury to the bird.

- It is important to check the leg ring the day after fitting to ensure it is still on. After this the leg should be checked from time to time to ensure there is no build up of faecal matter or other debris inside the ring.

(Hocking, K 1990)

➤ 6. FEEDING REQUIREMENTS

○ 6.1 Diet in the wild

- The Princess Parrot occupies sand dunes and sand flats in the arid zone of Western and Central Australia. Occurring in open savannah woodlands and shrublands which consist of *Eucalyptus* (including *E. gongylocarpa*, *E. chippendalei*, and *Mallee*) species.
- Their natural diet consists of seeds and some flowers, nectar and leaves. Seeds of grasses including *Triodia irritans*, *T. mitchelli*, *Danthonia bipartite* and *Rhynchelytrum repens*.

Spinifex, although not their main diet, also many eucalyptus and other native shrubs occurring throughout their range, including understorey of shrubs such as *Acacia* spp., (*A. aneura*), *Cassia* spp., *Eremophila* spp., *Grevillea*, *Portulaca oleracea*, *Stenopetalum anfractum*, *Calandrinia*, *Hakea lorea* and *Senna Casuarina* spp., *Allocasuarina* spp trees.

- Ground cover of *Triodia* sp.
- Berries of Mistletoe *Loranthus*

(Sindel & Gill, 2003)



Fig 21 Spinifex grass *Triodia sp*

○ 6.2 Captive Diet

- Food must meet the energy requirements of the birds. A wide variety of seasonal fruits and vegetables can be offered.
- Dry seed should only be fed as a supplement to daily feeds of green feed, sprouted seed, fruit and vegetables.
- The nutritional aspect of the diet needs to be enhanced prior to and during the breeding season.(see Section 10)
- The regular intake of fattening oily seeds such as sunflower seed, canary seed or oats in the diet can only lead to obesity and associated health problems. Such food should only be offered on a limited basis prior to the breeding season. They can be fed in unlimited quantities to breeding pairs rearing young.
- Seeds include: panicum, white millet and hulled oats.
Safflower and a mix of various herb seed including linseed, Niger, rape, maw, celery, cumin, fennel, cardamom, alfalfa, dill, caraway, mustard and aniseed.

Given at the rate of 1 x large tablespoon per week per pair.

A commercial product such as Trill Cockatiel Seed is readily available at most supermarkets and contains a complete diet including vitamin supplements and shell grit.(see Appendix for suppliers)

Ingredients are: White French Millet, Panorama Millet, Panicum, Wheat, Dehulled oats, Sorghum, Sunflower, Japanese Millet, Shirohie Millet, Oats, Canary seed, Linseed and Sunflower seed.

- This product contains 11.5% crude protein; 7.5% crude fat and 12.5% crude fibre (max)
- Fresh green feed is highly nutritious and non-fattenening and can include seeding grasses such as summer grass, winter grass, water millet, oats, milk thistles, chick weed, dandelion, pig weed and dock.
- Sown grains such as all varieties of millets, milo, wheat, oats, barley and canary seed will provide seed heads which, when fed at the milky stage, are a palatable and highly nutritious food source.
- Fresh vegetables should also be made available, although the birds may refuse to eat many varieties. Cauliflower, broccoli, green beans, peas and carrots are worth trying.

- Other foods include apple, oranges, Hawthorn, pyracantha and cotoneaster berries, cuttlefish bone, plain cake, and silver beet, flowers of Grevillea, Eucalyptus and Callistemon.
- During the breeding season seed can be soaked and/or sprouted (sunflower seeds) as well as offering egg and biscuit mix.
- Whole corn on the cob, Bok Choi, whole lettuce, Rosehips and Acacia blossoms can also provide feeding enrichment and variety in the aviary.
- Sprouted seed provides a continuous source of highly nutritious food especially when young are being reared.(see Section 10)



Fig 22 Captive Princess Parrots enjoy a wide variety of fruit Photo S Flew

(Sindel & Gill, 2003)

○ 6.3 Supplements

- Birds fed on a seed-based diet are most likely to require a supplement in their diet to provide the necessary vitamins, minerals, and amino acids.
- Deficiencies in these can have harmful effects in the long term, often resulting in low quality feathering, poor breeding and ill-health.
- Calcium powder or Calcium bells containing Limestone, charcoal and Vitamin C can be hung within the aviary. (www.parrotsociety.org)
- Trill Cockatiel seed mix contains vitamin supplement, including Calcium, Vitamin E, Vitamin A, Panthothenic acid, Niacin, Vitamin A, Iodine, Vitamin B6, Vitamin B12, Vitamin B2, Vitamin D3, Vitamin B1, Folic acid and vegetable oil.
- Vitamin supplements come in powdered form and can be sprinkled over seed or fruit.



Fig 23 Hanging bird feeders suspended from a tree Photo S Flew

○ **6.4 Presentation of Food**

- Food must be kept dry at all times so must be positioned within the aviary under shelter to prevent rain wetting the containers.
- Ensure feeders are not placed under perches, as the birds will contaminate the food with their droppings.
- Suitable feeders include ceramic or glass bowls. Self feeders can be suspended from the roof, but an adequate number of feeders should be provided if feeding larger numbers of parrots within the one aviary.
- Princess Parrots are often ground feeders; therefore it is necessary to ensure rodents are not being attracted to the aviary with the seed on the floor.
- Seasonal fruit which has been washed and free from spoilage and bacterial contamination, with plastic stickers removed, can be sliced in half or left whole and spiked onto nails hammered into the perches.
- Self feeders, which can be hung from the roof or branches, must be inspected daily to ensure they are flowing effectively and do not contain caked or unwholesome seed.
- Provide enrichment for the birds.(see section 9 Behaviour)
- Spoiled and uneaten fruit and vegetables must be removed on a daily basis.
- Shell grit and/or cuttlefish must be available at all times to ensure the birds can digest the seeds in the crop. This must be replaced as the birds consume it.
- A planted aviary can provide a natural diet and supplement seed given. Shrubs such as *Acacia* and *Grevillea* are suitable.
- Fresh palatable water must be available each day and not allowed to become stagnant.



Fig 24 Feeders elevated off the ground prevent pests such as rodents from eating the seed.
Photo S Flew

Mixed Seed	Fruit & Veg	Shell grit	Browse	Enrichment
millet	Green apples, spinach	Dried crushed egg shells	Grevillea	Seeded grasses
sunflower	Broccoli, oranges	Calcium carbonate	Banksia	Pine cones
Sprouted seed	Kiwi fruit	Shell grit	Eucalyptus	popcorn
peas	Corn cobs		Callistemon	Wattle seed
Lentils sprouted	Bok choy		privet	
Beans sprouted	lettuce		cotoneaster	
			Acacia flowers	

Fig 25 Table of diet

(Sindel & Gill,2003)



Fig 26 Suspended feeders allow waste to fall to the floor Photo S Flew

➤ 7. HANDLING and TRANSPORT

○ 7.1 Timing of Capture and Handling

- Birds should be caught up early in the morning when they have rested overnight, and are not excitable.
- Also the temperature is cooler which stops the birds overheating and reduces stress.
- Before the gates are open to the public, therefore there are fewer people around watching, making noise and causing distractions.
- Prior to feeding as they may regurgitate their food upon capture.
- Once caught they have the rest of the day to settle down and food may then be offered to assist making the birds feel more comfortable.

(Parsons,H, 1999)

○ 7.2 Catching Bags

- Small bird nets and/or bags are used to catch the parrots and restrain them. Big enough to contain one parrot comfortably. Must be able to fit over its head.
- Usually made from cotton and a dark colour (blue).
- Ensure no holes are in the bag and it's clean.
- Ensure there are no loose threads within the bag as these can entangle the bird's feet and claws and constrict the blood flow; turn the bag inside out.
- If only one or two birds are to be caught, then a soft towel will suffice, ensuring its clean and again no loose threads on the towel.



Fig 27 Catching bag Photo S Flew

○ 7.3 Capture and Restraint Techniques

- Enter the enclosure and remove all furnishings – perches, browse, water containers and feeders – to make moving around the enclosure easier.
- Have bird catching bag and transport box ready.
- Spot the bird you want to catch, single it out and watch its movements.
- When it settles go for it covering with the net or towel quickly to restrain it
- If the bird is on the wire gently let it drop into the bag.
Once in the bag turn the handle to prevent escape and drop the bag to the floor, securing the bird within the bag
- Place your left hand behind the bird's head firmly, with thumb and forefinger on the jaw and forefinger on the top on the head.
- Once the bird is restrained, put your right hand into the bag and, coming from behind, move your hand up over the body and change hands over.
- With the left hand, tuck both wings into the body and secure.
- Lift out of the bag and examine if necessary.
- Movements must be slow and flowing to minimize stress.
- Once the bird is caught and no additional procedures are required to be performed (weight, examination, medication, measurements, etc):-
- Place into transport container or pet pack. Cover with towel.
- Catch other birds if required.
- Occupational Health and Safety measures: be aware of zoonoses, use Personal Protective Equipment; wear gloves, face mask and prevent bites and scratches where possible.
- If bitten or scratched wash area with warm water and soap and apply Betadine to affected area.

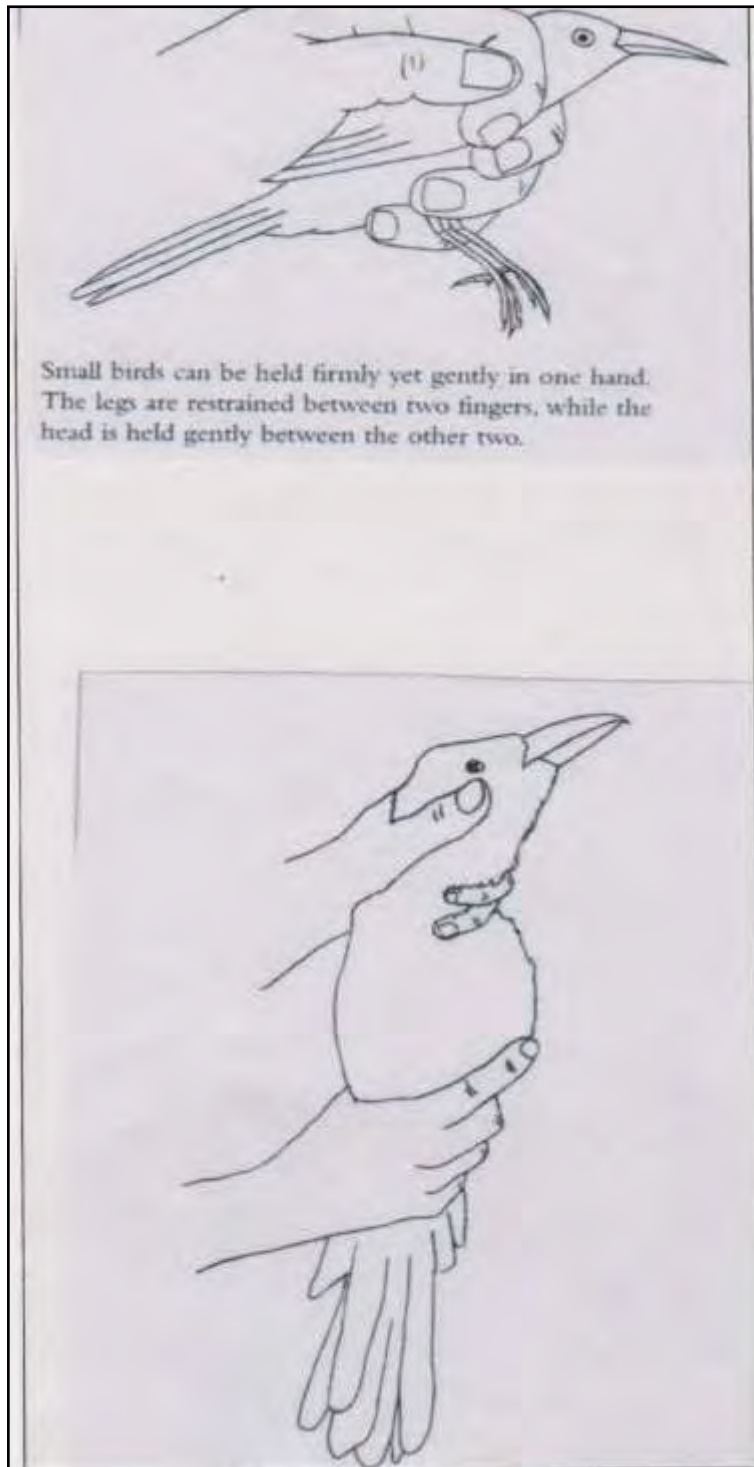


Fig 28 Restraint techniques (Parsons,H 1999)

○ **7.4 Weighing and Examination**

- Each bird's weight must be recorded and a thorough physical examination carried out to determine the general health of each bird prior to transportation. This information must be recorded on the animal's record form.
- Once the bird has been caught and restrained, identify the individual birds by leg band number and colour.

Examination:

- Examine the eyes; they should be bright and watchful, with a normal sized pupil.
- Examine the beak and ears for any abnormalities or discharges.
- Examine the feet by gently extending each foot and checking for a perching reflex; each joint within the foot should be checked. Also check for any abnormalities such as swelling, discharge, inflammation, odour or pain.
- Control must be maintained at all times with a firm hold of the elbow joint.(see Fig 24)
- Examine the wings by gently extending each wing out to the side and holding the top, check all flight feathers are intact and in alignment.
- Examine the tail for broken feathers or abnormalities.
- Examine the cloaca for signs of discharge or faeces, swelling.
- Blow on the abdomen area around the pectoral region to determine general body condition.
- Check the general health of the bird.
- Check for excessive parasite burden.
- Age, health condition, reproductive status, vaccination information, external and internal parasite treatment and weights must be recorded for each bird on the appropriate record form.
- Minimize the length of the procedure to avoid stress.
- Only birds in good health should be transported.

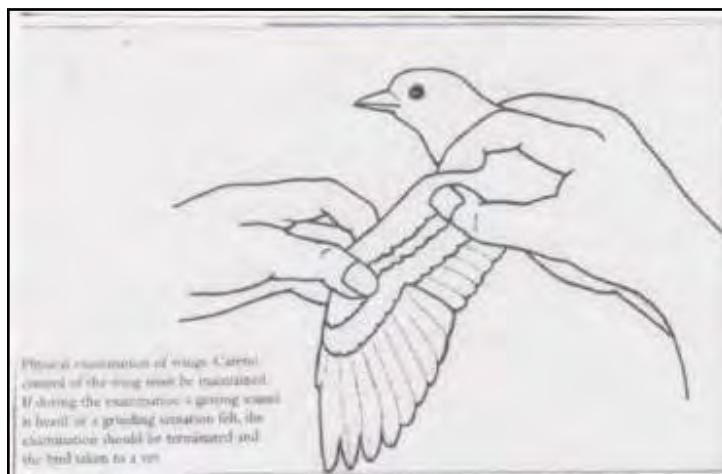


Fig 29 Examination of the wings (Parsons, H 1999)

Weighing:

- Select equipment and ensure scales are working correctly and zeroed.
- Weigh box and bag before hand.
- Capture and restrain a bird and place in bag and box.
- Place onto scales and record the weight.
- Deduct weight of box and bag.
- Observe and monitor for signs of stress and injury.
- Birds which have become sick or are injured during transport must receive veterinary treatment as soon as possible.

(www.cities.org) TAFE Standard Operating Procedures for Birds (Parsons,H. 1999)

○ 7.5 Release

- Release from the box usually occurs when the bird is ready so open the door and leave the bird to come out by itself.
- If the bird has received treatment or has been isolated from the flock you may consider releasing into a holding enclosure for observation for a few days prior to release into a large aviary.
- Check if bird is flying and eating normally. BAR- Bright Alert Responsive.
- Early in the morning is the best time, when it's cooler and they have the whole day to settle down, and you can observe quietly throughout the day.
- Using a soft towel to catch the bird prevents injury to the handler, although sometimes it's better to allow the bird to exit from the box when it is ready.

○ 7.6 Transport Requirements

• 7.6.1 Box Design

Materials include wire mesh, non-toxic timber, non-toxic plastic, fibreglass, synthetics and muslin or other light material. Must be of adequate framework to ensure it is strong enough to house birds and withstand handling involved during transport. Escape proof.

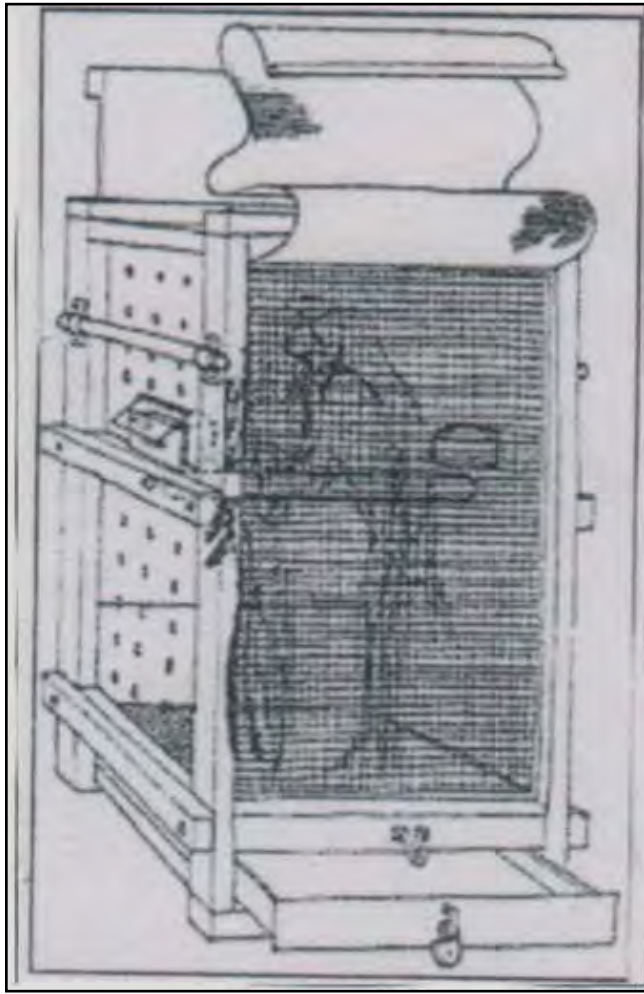
- Size: To allow the normal and necessary freedom of movement of the bird species will determine size.
- Frame: A solid timber frame 2m x 4m glued screwed or nailed together. Must use non-toxic glue.
- Sides: Plywood or other material of equivalent strength is generally suitable. Both sides of the container must be of the minimum thickness of 0.6cm.

The interior of the container must not have any sharp edges or projections.

The front must be sloped to provide extra ventilation and be covered with a 0.3cm wire mesh which must encompass 75% of the frontal area.

A muslin or cotton cover must be provided to reduce light inside the container.

- Handling space bars/handles: these must be provided on 3 sides of the box for ease of lifting.
- Floor: Solid and leak-proof, 1.2 cm thickness, with a wooden perch. The diameter of the perch must be large enough for the bird to grip comfortably. The perch must be placed to prevent droppings falling into the water and food troughs or onto other birds. The perch must be placed at an appropriate height to allow the birds to leave the perch without their heads touching the roof, nor the tail touching the floor while perching. These parrots have long tails therefore this requirement needs to be carefully addressed. There should not be enough room for attempted flight.



2m x 4m

Fig 30 Transport container suitable for Princess Parrots (www.IATA.gov.nsw.au)

- An additional floor of suitable mesh should be provided above a removable, waterproof tray with a suitable quantity of absorbent material.
- Roof: Must be solid with holes for ventilation.
- Door: Solid wood door of 1.2cm thickness, sliding or hinged to each box or compartment of the box. There must be a secure means of fastening each which is not accessible to the birds.
- Ventilation: Meshed openings approx 2.5cm diameter must be provided at approx 5 cm distance apart along 3 sides of the box. Must ensure adequate airflow at all times in case high temperatures are encountered.
- There must be no sharp edges present and care should be taken to avoid draughts.
- Spacer bars of adequate size should be fitted to all walls, roof and base of the box, Ensure a free flow of air to the birds in the event of stacking or close stowing of cargo.
- Smaller rather than larger compartments are advised to avoid injury by thrashing about of frightened or stressed birds.

(Sindel & Gill, 2003) (www.cities.org)

• **7.6.2 Furnishings**

- Artificial turf, carpet, shredded paper or newspaper can be used as a substrate material on the floor of the box, this helps to prevent slippage.
- This may require changing throughout the journey, depending on the duration.
- If towels or cotton is used, no threads must be loose for the bird's feet to become entangled.
- Faecal matter or spilled food must not be able to contact the bird and cause contamination.
- A low perch may be included depending on the duration of the trip.
- All boxes must be cleaned and disinfected between uses.(see Appendix for cleaning agents)

• **7.6.3 Water and Food**

- Separate food and water containers must be provided, stainless steel d-cups one containing a mixed seed and the other water with a small sponge to prevent spillage will suffice.
- Moist pieces of fruit, such as apple and orange can also provide water to prevent dehydration during the journey.
- The food containers must have rounded edges and be made of non-toxic materials suitable for parrots.
- Access ports need to be provided to enable the box to be maintained throughout the trip and topping up seed and removing spoiled fruit and replacing with fresh fruit as necessary.
- Shipper's instructions for feeding must be in writing at the time of departure.

• **7.6.4 Animals per Box**

- Accurate weights of individual birds must be obtained prior to shipping as this determines how many animals can be transported, due to weight and space limitations.
- Unless birds of the same species are known to be compatible with one another, they should not be transported in the same box. Therefore I would recommend one bird per box, depending on the duration of the journey.
- Animals must have fresh air ventilation, humidity, and the ability to extract CO₂.

• **7.6.5 Timing of Transport**

- Temporary transport - Early in the morning is the best time to arrange transport for parrots to reduce stress and allow the bird's time to settle after the journey.
- Allows for observation after release.
- Provide a comfortable, quiet environment.
- Birds should be checked during transport and conditions altered if there is a problem.
- There should be an appropriate period for holding and conditioning of birds prior to transport.

(www.cities.org) ARAZPA guidelines

• **7.6.6 Release from Box**

- The birds must be quarantined before being released into their new enclosure.
- Maybe released into a holding cage for a week.
- The birds must have a thorough physical examination as soon as possible after release from the box by a Veterinarian or responsible keeper.
- Food and water must be available upon release into the new enclosure.

(ARAZPA Guidelines)(www.IATA.gov.nsw.au)

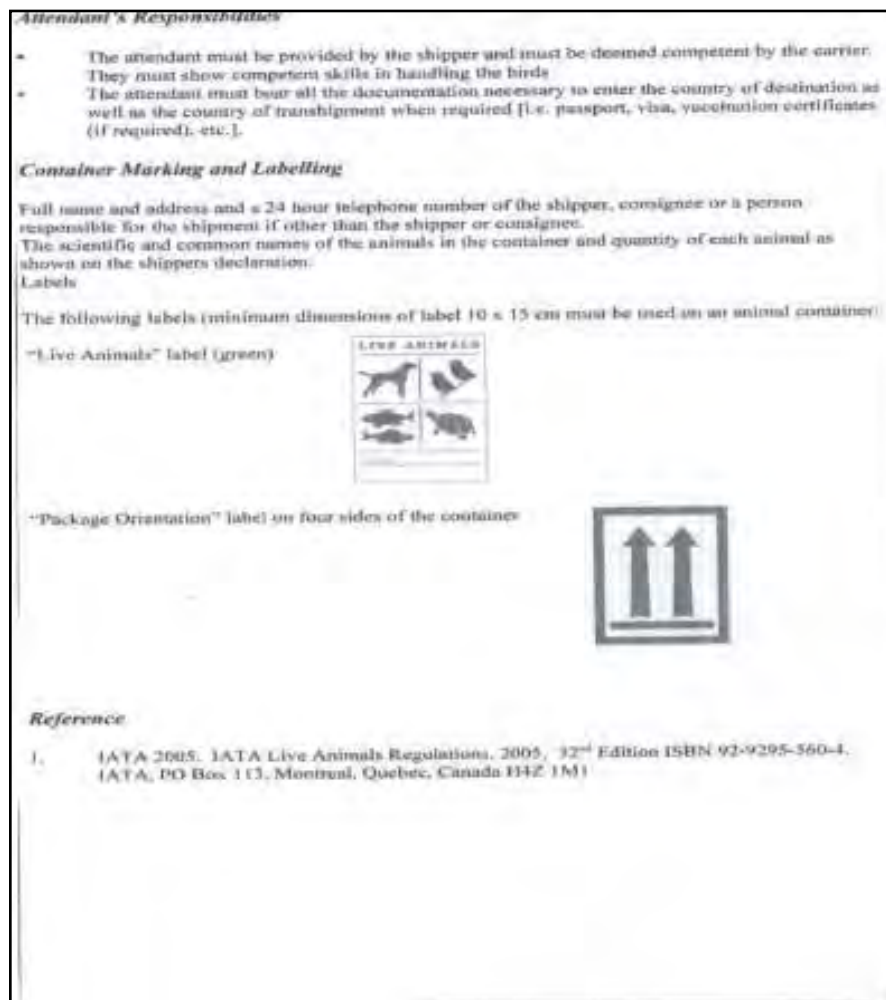


Fig 31 Container labelling (www.IATA.gov.nsw.au)

➤ 8. HEALTH REQUIREMENTS

○ 8.1 Daily Health Checks

Observations are generally undertaken during cleaning and feeding each morning, it is important to be able to identify a bird which is off-colour at an early stage this may prove vital in saving a birds life.

- Observe from a distance, far enough away so as not to disturb the birds or cause them any stress. Things to LOOK FOR:
 - Is it breathing?
 - Is it standing or perching evenly on both feet?
 - Are the birds flying around the enclosure normally or staying in one place or on the ground?
 - Are both wings held in the normal position?
 - Is the bird fluffed up?
 - Is it bright, alert and responsive- looking around or is it depressed?
 - Is the head tilted to one side?
 - Are there any obvious swellings, discharges or wounds?
 - Are the birds feeding normally?
 - Any signs of feather loss or flaking of the bill and claws?
 - Are both eyes clear and open?
 - Any changes in behaviour? Aggressive, isolated from other birds, stumbling about?
 - Are the birds preening normally?
- (Parsons,H 1999)

○ 8.2 Detailed Physical Examination

• 8.2.1 Chemical Restraint

- Can use Alfaxan if a very nervous bird is to be caught.
- Body temperature: 39-43.C you can use your fingers to feel for temperature, either under wings or on feet.
- Respiration rate: 100-150/minute
- Faecal flotation - internal parasites present/ blood?
- Blood: full blood count
- External parasites present?

• 8.2.1 Physical Examination

- Catch up the bird if it's not presenting normally.
- The examination should be done as quickly as possible to reduce stress.
- Be firm but gentle. Control the wings and feet to prevent injury to yourself and the bird.
- If the bird begins to look distressed; open-mouthed breathing or excess fluttering, put it into a box and continue later.

- We are looking for the reason why the bird is not presenting normally: head trauma, broken wing, animal attack, disease or parasitism.
- Begin at the head and move down the body....
- Examine the eyes; any discharges, lost feathers, blood in or around the eyes, this may be caused by an infection or head trauma, can it see?
- Examine the nose; any discharges, bleeding, matted feathers above the nose may indicate discharge from an infection. Bleeding may indicate head trauma.
- Examine the mouth; any blood or swelling under the top beak –head trauma. Lumps next to the tongue may indicate disease.
- General colour; is it pale – may indicate poor nutrition or shock.
- Matted feathers in corners of the mouth may indicate vomiting.
- Is the bird's demeanour bright – does it resent handling, want to bite or is it dull and not reacting to your examination. This may indicate head trauma.
- Condition; feel the pectorals area, it should be curved, if the keel bone is prominent then the bird is thin. This may indicate a chronic disease.
- Examine the cloaca: is there diarrhoea present? – green matted feathers.
- Are urates present: this may indicate kidney disease or stress.
- Are the tail feathers broken and dirty? May have been on the ground for some time.
- Are the faeces matted around the cloaca?
- Examine the feathers: check for beak and feather disease over the rump. (see page 47)
- Hold up the wings to check for lice.
- Are any flight feathers missing or broken? These may impair flight.
- Are feathers missing? Particularly near puncture wounds – cat attack.
- Are any feathers bleeding badly? Indicating a damaged follicle.
- Look for swellings: bruising may be present between the wing and rump, may indicate cat attack.
- Bruising along the wings and legs may indicate a fracture.
- Is there any swelling in front of the shoulder or front of leg, may indicate burst air sacs.
- Examine the wings: pull each wing out to its full extent, one at a time. If it cannot, or the bird struggles, may indicate a fracture.
- Are the wings symmetrical? There is very little muscle over the wings, so if you can see a swelling, check the other wing for one.
- Hold the ends of each bone and wiggle gently. A fracture can be felt by grating bone ends.
- If it looks ok you can hold the feet and watch the bird flap its wings. An inability to do so may indicate head trauma. One wing may be less mobile indicating a possible fracture.
- Examine the legs: pull each one in and out within its range of motion.
- Are they symmetrical? Do they face the same direction?
- Are they able to grab your finger? Or are they weak?
- Examine the toes for swellings.
- Feel up the leg to the pelvis, any swelling?
- Check the urine/faeces: a large amount of urine may indicate stress or kidney disease.

- Urates should be white, if bloody may indicate kidney disease, lead poisoning, if green may indicate psittacosis.
- Faeces should be a colour consistent with the diet, if few may indicate starvation or malnutrition. If bloody may indicate gut bleeding or worms.
- Look at the breathing; open mouthed breathing may indicate shock, any wheezing or sneezing may indicate lung disease.

(MacWitter,P) (Parsons,H 1999))

○ **8.3 Routine Treatments**

- Worming treatment with worming syrup (see Appendix for details Mites/lice) – dust heavily infected birds with pyrethrum powder/spray. Repeat treatment in a week's time.

Lovitt's Bird Mite and Lice Spray, Active constituents Pyrethrums, Piperonyl Butoxide, for control of lice *Mallophaga spp.* Spray about 40cm from bird, also treat cage and perches where mites could lay their eggs.



Fig 32 Lovitt's Whistler worming and mite/lice spray. Photo S. Flew

○ **8.4 Known Health Problems**

- Non-infectious diseases include injuries (fractured wings or legs, head injuries etc), nutritional deficiencies (Calcium inadequacy, starvation, Vitamin A deficiency) or a nutritional excess (obesity) or excesses of heat (heat stroke) or cold (hypothermia).
- Non-infectious diseases can predispose a bird to infectious diseases.
- In my experience the most common cause of losses in aviaries are accidents, injuries and escapes.
- By quarantining all birds prior to birds coming into the collection and maintaining good hygiene for all birds, this will reduce health problems.
- Ensure the bird's immune system is working well by housing, by feeding and managing the bird well. Avoiding stress from weather, poor nutrition, external predators or from other birds in the collection.

- Wild birds which perch above the flight aviary are a common source of infection through faecal matter dropping through the wire mesh roof.
Rodents are also responsible for the introduction of many diseases and bait stations may be required to help control these pests.

(Sindel & Gill, 2003)

✓ Psittacosis *Chlamydophilosis*

➤ **Cause:**

- (Also known as “parrot fever”) is a disease caused by an organism called *Chlamydia psittaci*, recently renamed *Chlamydophila psittaci*.
- Psittacosis is considered to be an important disease not only because it infects mainly birds, but also because it is a zoonotic disease, which can be transmitted to humans.
- The bacteria is unusual in that it has certain characteristics of bacteria i.e. it is relatively large and sensitive to antibiotics; but it also resembles viruses in that it can only grow and multiply within the cells of its host.
- The rupture of these cells and the release of toxins into the hosts system then cause the damage. It appears to infect and multiply in most types of cell; therefore a widely variable disease pattern is seen in different individuals or species.
- Also making it difficult to detect in the early stages. Many birds carry the organism but display no signs.

➤ **Signs:**

- Chlamydophilosis may show up as any combination of the following symptoms: eye discharge or swelling (conjunctivitis), laboured respiration, green diarrhoea, general lethargy, poor appetite, weakness, weight loss, nasal discharge, blinking or partly closed eyes, sneezing, general poor condition, plugging of nostrils, a ‘fluffed up’ appearance or sudden death.
- The disease may be presented in three main forms chronic, acute or eye form.
- The chronic form where the bird appears critically ill, having for example ruffled feathers, generalised weight loss and soiled feathers around the cloaca. This form is often confused with intestinal parasites.
- The acute form in which an apparently healthy bird, showing no outward signs, dies unexpectedly. The sudden death may be attributed to other causes such as trauma or a head injury.
- Or the eye form, which is the most common form of the disease may be the loss of feathers or swelling of the eye (conjunctivitis)

➤ **Transmission:**

- One or more strains of *Chlamydophila* are present in most aviaries. The majority of birds are passively infected by their parents at a young age and then build up a natural immunity to the organism.
- Most parrots by the time they are 6 months of age and almost certainly by the time they are 12 months of age have developed a strong natural immunity.
(Cannon,M. 1996) (Doneley 2000) (Macwhirter,P. 1987) (Shephard,M. 1989)

- Therefore the majority of birds infected by the disease are young birds, birds that have come in contact with a different strain of *Chlamydophila* or as in most cases birds have become stressed and their natural immunity will not protect them from the disease.
- Some bird's act as carriers of the disease but shows no outward signs. However, when a carrier is subjected to stress, for example through catching, handling, transporting or overcrowding, the carrier may shed large numbers of infected micro-organisms.
- Can be transmitted through contact with infected faeces; inhalation or ingestion of aerosols or dust containing contaminated materials such as feathers or skin scale, or orally from parent to nestling.
- Young birds are the most susceptible to the disease. Dried faecal matter can be infective for months. Mites, lice, flies and other insects can be vectors in the spread of the disease.
- Wild parrots, pigeons and waterfowl have the potential to infect captive birds by faecal matter through open enclosure wire.

➤ **Diagnosis:**

- Positive diagnosis of Chlamydophilosis in live birds is sometimes very difficult, depending on the species, length of time since exposure and the general condition of the bird.
- In addition to having the capability of producing disease on its own, *Chlamydophila* undermines the immune system and opens the body to other pathogens, so other bacterial or viral disorders may be occurring at the same time.
- Pathological tests may need to be conducted to determine the presence of the infectious organisms. These can be faeces cultured to try and grow the organism, any discharges collected off birds could be stained and examined under the microscope or blood tests may be carried out.
- None of these tests are considered to be accurate. An x-ray that shows the liver and spleen enlarged could suggest Chlamydophilosis.
- Post mortem examinations of dead birds usually show an enlarged liver or spleen, from which the organism can be more easily isolated. Occasionally the liver may have a mottled appearance and other parts of the body such as the air sacs and kidney may be inflamed.

➤ **Treatment:**

- Doxycycline (Pssitavet) is the most common drug used to treat *Chlamydophilosis* and are generally administered by injection or orally.(see Appendix)
- To treat an individual bird the preferred treatment is by injection or orally using a tablet, paste or solution in a crop needle. However, for an extreme case an intravenous injection may be more appropriate.
- If a large number of birds become infected or there is a spreading infection where a new bird becomes sick every few days, then a flock treatment should be undertaken.
- The only practical method of treating a large collection of birds is by placing medication in drinking water. Use glass or plastic containers as metal or ceramic containers make the drug unavailable to the bird. This method can be inefficient as

- the water-soluble forms of medication are fairly unstable and break down by exposure to light and temperature changes.
- The medicated drinking water needs to be replaced daily and changed in the evenings when the potency of the medication can be maintained through the night and be available for the birds to drink in the early morning. It is difficult with this treatment to ensure individual birds get the correct amount of medication.
- Commonly treatments of a single course of medication for 7 – 14 days would bring the disease under control. Occasional ‘pulse’ treating a flock 3 days every 2 – 3 weeks would also bring the disease under control. If the aim of the treatment were to eliminate the disease completely then each individual bird would be treated for 30 – 45 days until the disease has been positively eradicated from the birds system.
- Unfortunately this would also eradicate a bird’s natural immunity and leave the bird exposed to reinfection. Bringing the disease under control gradually while still allowing birds some exposure to it enables the birds to build up their natural immunity over time.
- During treatment stress to birds should be minimised by ceasing breeding, not having any new introductions to the collection, remove any birds that are bullies, improve diets; provide complete protection from climatic elements.
- Clean and disinfect infected aviaries daily. Allow 2 – 4 weeks after treatment before recommencing any breeding.
- Isolate infected bird from others
- Remove all sources of calcium as it will make the drug unavailable to the bird.

(Cannon,M. 1996) (Doneley 2000) (Macwhirter,P. 1987) (Shephard,M. 1989)

➤ **Prevention:**

- Prevention is best achieved by having strict quarantining of all new birds to a collection, eliminating or avoiding as much as possible any actions that may cause stress in birds and immediately isolate any birds that are suspected of having *Chlamydophilosis*.
- Where possible an avian veterinarian should complete screen tests on all new birds during the quarantine period before including in collections.
- Most important is to maintain a clean and healthy environment for all birds to help prevent any future outbreaks..
- Remove all faecal matter from perches, nest boxes, feeders and the floor. Wet clean thoroughly with detergent and disinfectant and avoid making dust.
- Use personal protective equipment such as face masks, gloves, overalls, personal disinfection.
- Scrub the aviary with bleach (10ml/1litre water) or phenolic based disinfectant. Allow the aviary to dry before reintroducing or release of the birds.
- See OH&S section

(www.dpi.nsw.gov.au)

(Cannon,M. 1996) (Doneley 2000) (Macwhirter,P. 1987) (Shephard,M. 1989)

✓ **Aspergillus (*aspergillus fumigatus*)**

- Cause- Fungal infection. Spores occur in damp organic matter like straw or hay, which should not be provided as a nesting material.
- Signs- laboured breathing, open mouthed and at times loud, loss of appetite, weight loss, ruffled feathers, nose or eye discharge and general lethargy.
- Treatment- this is difficult with little chance of a full recovery.
- Prevention- Regularly clean floors in aviaries, no damp hay, straw or organic matter to be used. Reduce stress, good ventilation.

✓ **Intestinal Parasites - Worms:**

- Cause – round worms, hook worms, tapeworms, threadworms and gapeworms are all common intestinal parasites.
- Signs- failure to gain weight, eating more than other birds with no weight gain, unusual droppings, worms visible in throat or cloaca areas, leg paralysis.
- Treatment – Ivermectin at 200ug/kg repeated in one month, this is effective for all except tapeworm.(Use Droncit)
- Panacur 25 (25mg/ml) at 20mg/kg once daily for 3-5 days. Panacur 10 may be fatal to birds even when diluted.
- These birds are susceptible to roundworm infestations as they spend a great deal of time on the ground. Therefore they require treating with an anthelmintic every 3 months.
- Prevention- Reduce stress, keep aviaries clean, avoid overcrowding, and quarantine all new arrivals.
- Transmission- faecal matter ingested from parrots feeding on the ground.

(Cannon,M. 1996) (Doneley 2000) (Macwhirter,P. 1987) (Shephard,M. 1989)

✓ **Roundworm**

Cause:

- An internal parasite that is a common problem in Princess Parrots and are also prevalent in a variety of others birds, both in captivity and in the wild.
- A bird will contract worms if it ingests the eggs of the roundworms, which are excreted in the faeces of infected birds.
- The ingested egg hatches in the bird's intestine, producing a larvae or immature worm which buries itself into the intestinal lining and then matures into an adult worm.
- The adult worm, which is usually found free in the intestine, then lays eggs, which are expelled in faeces and the cycle of reinfestation starts again.
- The complete life cycle from the ingestion of eggs to passing of further eggs by the adult worm takes six weeks. If large numbers of adult worms are present the intestine could become completely obstructed. Worm eggs are extremely resistant to temperature changes and can remain dormant on aviary floors for long periods. Hot moist conditions are conducive to the worm eggs becoming infective.



Fig 33 Roundworm (*Ascaridia*)

➤ **Signs:**

- Birds carrying a heavy worm infestation will generally be listless, lethargic, have ruffled feathers, and excrete loose faeces causing matted feathers around the cloaca and weight loss.
- The loss of weight is caused by the worms absorbing nutrients from food inside a bird's intestinal tract, at the expense of the bird's nutritional requirements. The same signs are usually seen in other types of worm infestations such as hairworms (*Capillaria*).
- Fresh faeces can be collected by placing newspaper under the roosting perch of a bird suspected of having roundworms. The faecal samples can then be examined for the presence of worm eggs under a microscope using a faecal flotation test.
- On autopsy the adult worms are often large enough to be seen in a bird's intestine.(see fig 31)

➤ **Treatment:**

The most commonly used methods are in-food medication, in-water medication or using crop needles for individual birds.

- Large numbers of birds can be flock treated using in-food or in-water medication methods, however, these methods are not completely accurate as it is difficult to be sure that each individual bird has received the correct amount of medication.
- Drugs used for in-food or in-water medication must be water-soluble. Giving individual doses of drugs by crop needle is the most accurate method.
- The taste of in-food medication can be partly masked by using highly flavoured and attractive food supplements such as smearing the medication on cake or apple.
- In-food medication can also be administered in seed soaked in the medication and then mixed with cooking/vegetable oil. However, this must be the sole source of food for one week and needs to be repeated a month later.
- Constant monitoring is required of all birds that are being flock treated, especially with in-water medication to ensure that it is not over consumed.

(Cannon,M. 1996) (Doneley 2000) (Macwhirter,P. 1987) (Shephard,M. 1989)

- This bitter taste can be over come by adding glucodin, honey or sugar to sweeten the medicated water. To give in-water medication all water, green food and fruit should be removed from an aviary for 16-24 hours prior to administering. The medicated water should be the sole water supply for 1-3 days depending on the drug used.
- Water-soluble forms of medication are fairly unstable and can break down by exposure to light and temperature changes.
- The medicated drinking water needs to be replaced daily and changed in the evenings when the potency of the medication can be maintained through the night and be available for the birds to drink in the early morning.
- Water dishes must be glass, sealed ceramic or plastic. Galvanised or terracotta dishes will often absorb the medication rendering it unavailable for the birds.

(Cannon,M. 1996) (Doneley 2000) (Macwhirter,P. 1987) (Shephard,M. 1989)



Fig 34 Size, shape and overall difference in appearance of (from the left) Roundworm, Gizzard worm and Tapeworm.



Prevention:

- The practice of having faecal samples regularly tested by a veterinarian, every three months will assist in determining how frequently a worming program should be conducted in a collection.
- All newly acquired birds should undergo anthelmintic treatment while in quarantine with faecal testing conducted in conjunction with the treatment before being included in a collection.
- A strategic monitored worming program should be implemented that will be effective in breaking the life cycle of roundworms.

- If roundworms have been previously diagnosed in an aviary, initially all birds should be regularly medicated every 3 months. 2-3 weeks before they start nesting and 1-2 weeks after all young birds fledge.
- Part of the worming program should include anticipating the times when administering the medication would be the most effective and when birds may be more vulnerable to roundworm infestation, which may be after heavy rain, during warm temperatures and high humidity and during times when birds in a collection are recognised as being under stress.
- Alternatively there could be a pro-active worming program where all birds in a collection are wormed regularly every 8 weeks throughout the year.
- Worming drugs should be alternated to avoid the build up of any resistance. All aviaries where possible should have concrete floors and be cleaned out daily or a minimum of once a week.
- Any permanently damp areas in an aviary should be removed and drainage improved. Suspended cages and aviaries should be used where practical to reduce access by birds to faeces. (see fig 27)
- Where possible aviaries should be fully roofed to prevent wild birds introducing roundworm eggs into an aviary by passing faeces through a wire roof.
- All wild collected green food, and fruit and vegetables should be washed before feeding.



Fig 35 Suspended cages reduce access to faeces. Photo S Flew

(Cannon,M. 1996) (Doneley 2000) (Macwhirter,P. 1987) (Shephard,M. 1989)

External Parasites:

These include ticks, lice, mites, Cnemidocoptes mite and hyboscid flies.

They are only a problem if the burden is heavy. Remember that stress will increase the parasitic burden so treatment may be required, particularly as blood suckers will debilitate the bird.

✓ Mites:

- Cause – external parasites
- Signs – live in the feathers, agitation and continual preening, general lethargy, restless at night.
- Treatment – dusting heavily infested birds with dusting powder (Carbaryl insecticide) and isolate. Shell tox mini pest strips can be hung permanently in the aviary. Ivermectin will be effective in removing blood suckers.
- Prevention – clean the aviaries regularly. Spray with safe insecticide.
- Quarantine new arrivals. Paint perches with residual insecticide.

(Cannon,M. 1996) (Doneley 2000) (Macwhirter,P. 1987) (Shephard,M. 1989)

✓ Psittacine Beak and Feather Disease (PBFD)

➤ Cause:

- Caused by the virus *Psittacine circovirus*. The virus infects and kills the actively dividing cells, which produce feathers, beaks and claws but can also damage the cells of a bird's immune system.
- *Psittacine circovirus* only causes problems for psittacine birds (parrots and cockatoos).

➤ Signs:

- PBFD is seen more often in young birds with the growth of the first generation of feathers after the loss of natal down. Birds of all ages can be affected by the virus.
- Birds may be affected by PBFD for months before developing any feather abnormalities.
- PBFD can occur as acute, sub acute or chronic forms, having some or all of the following symptoms:
- Dark red-brown patches in feather shafts – sudden appearance in developing feathers.
- Loose feathers – abnormally formed (particularly primary flight and crest feathers), usually the powder-down feathers first affected (loss), bare patches, dull plumage.
- Shedding feathers – deformed or constricted base/outer sheath.
- Patches of yellow feathers appear in a green bird.
- Beak changes – ulcers and plaques internally, external beak elongation and fractures, beak becomes glossy. (cockatoos)
- Excess or abnormal urine.
- Secondary infection due to poor immune system – rapid in young birds, loss of appetite, regurgitation, diarrhoea, pneumonia, other viral, fungal, bacterial or parasitic infections, death.
- Birds under stress can be more prone to the virus.

There are variable outcomes for birds that contract PBFD: they can regrow normal feathers and appear to recover, suffer permanent feather damage becoming ‘runners’ or slowly contract the debilitating symptoms towards death in chronic cases.

(Butcher & Beck, 1996) (Cannon,M 1996) (Macwhirter,P 1997) (Sindel & Gill 2003) (Shephard,M 1989)

➤ **Transmission:**

- Virus particles can be found in feather dust and faeces. Birds may contract the virus either by direct contact with another contaminated bird, via inhalation or ingestion.
- The virus can be transmitted via contaminated surfaces such as bird carry boxes, feeding utensils and dishes, nesting material and on clothing.
- The viral particles, if not destroyed, can remain in the environment for many months or even years on contaminated material after a contaminated bird has been removed.
- The incubation period from exposure to the virus to the appearance of symptoms varies from three weeks to several years.
- Some birds exposed to PBFD do not always get the virus. Many individual birds can develop immunity to PBFD.
- It is not yet fully understood why this immune response occurs and if these apparent normal birds are carriers that may affect other birds.

➤ **Diagnosis:**

- Severe on-going PBFD is not difficult to visually diagnose. Birds that only show subtle symptoms due to age or have some immunity to the virus are more difficult to diagnose.
- Feather testing is preferred, as affected birds do not excrete high concentrations of the virus in faeces.
- Powder-down feathers are the best feathers for this test as these are the first feathers to become infected.
- A blood test can also be used to screen birds for the virus or to confirm a diagnosis. Consult your local Veterinarian.

➤ **Treatment:**

- No known treatments. Experimental vaccines are being developed.
- Affected and ‘in contact’ birds should be isolated from other healthy birds.
- Euthanasia should be considered for all birds that display the symptoms of PBFD, especially if any suspect birds would endanger the future health of other birds.
- Contaminated cages, feeding utensils and aviaries should be thoroughly cleaned and disinfected. Any contaminated nest boxes should be destroyed.
(chloramine, glutaraldehyde, based disinfectants like Vircon see MSDS in Appendix section)



Prevention:

- Maintain birds in a clean healthy environment with a well-balanced and nutritional diet.
- Aviaries should be covered to prevent wild birds from having any contact with aviary stock and also to prevent any infected faeces from being deposited.
- Remove all faecal matter and feathers regularly from aviaries.
- Replace nest boxes regularly.
- Do not continue to breed from any birds that have produced young infected with PBFD.
- Always obtain birds from reputable PBFD free stock.
- Vaccine has recently been developed which stimulates immunity to the virus. Does not cure birds already infected.

○ 8.5 Quarantine Requirements

- This is the location where all new arrivals to the aviary are to be housed until such time as they are determined admissible to the breeding aviary.
- The quarantine area is the primary defence with which the existing collection can be protected from the introduction of infectious disease agents.
- Quarantine reduces the bird's access to bacteria, viruses, fungi and parasites.
 - Duration ; 30 days
Disease considerations/incubation periods
 - Parasites TX before releasing into the collection. Dusting with Pyrethrum powder. Worming solution put into water.
 - Screen for roundworm and if necessary TX.



Fig 36 Quarantine enclosures must be kept in isolation and be easily disinfected. Photo S Flew

(Butcher & Beck, 1996) (Cannon,M 1996) (Macwhirter,P 1997) (Sindel & Gill 2003)
(Shephard,M 1989)

Health screening while in quarantine:

- Quarantine should last for 30 days. The following are recommendations for appropriate testing procedures for diseases of birds while held in quarantine. When large numbers of birds of the same or related species are held as a flock or contiguous group, a series of random faecal samples should be examined.
- 1. Faecal examination, direct and flotation, for trichomonads, other motile protozoa and coccidia and tapeworms in small passerines.
- 2. Check for ectoparasites, especially *Amblyomma sp.* ticks that can be vectors of disease. Dust with medicated Pyrethrum.
- 3. Carry out appropriate serological tests for chlamydiosis (psittacosis) and if positive, confirm by cloacal swab cultures. If culture is positive, the bird must be treated if of conservation value or destroyed if not. Treatment, which in some countries is mandatory for psittacine birds in quarantine, is lengthy, consisting of 45 days continuous feed medication with chlortetracycline.
- Note: Chlamydiosis (Psittacosis /ornithosis) is a dangerous zoonosis..
- 4. Collect samples (choanal and cloacal swabs) for virus isolation from all incoming birds. Samples may be pooled from members of a flock. Samples for virus isolation should be routinely collected from all birds, which die in quarantine. All virus isolation tests should be negative in birds destined for release or entry into captive breeding flocks.
- 5. Carry out complete Blood Count and PCV.
- 6. Carry out serology/ELISA, as appropriate, for aspergillosis, *Chlamydia sp.*, and, for psittacines, “beak and feather virus” disease,

(Butcher & Beck, 1996) (Cannon,M 1996) (Macwhirter,P 1997) (Sindel & Gill 2003)
(Shephard,M 1989)

➤ 9.BEHAVIOUR

○ 9.1 Activity

- Princess Parrots spend a lot of time on the ground, therefore scatter trays containing pieces of bark, gum nuts, leaves, flowers, pinecones, seeded grasses picked fresh every other day and pieces of dried fruit can be placed on the floor of the aviary.
- Sliced fruit and vegetables placed on spikes on the branches throughout the aviary can include apples, melons, oranges, kiwi fruit, lettuce, spinach, capsicum with seeds, whole corn cobs, beetroot, broccoli and peas.
- Ladders, perches at different heights and thicknesses, branches with bark to chew, toys, balls, bells and mirrors.
- Corn husks placed on the floor.
- Scrunched up paper either placed in the enclosure just as is or several pieces placed inside a water bottle which has several holes drilled into the sides.
- I rotate these activities throughout the month, changing the cage furniture and branches around, moving the water and food containers.(see Fig 29 monthly calendar)
- There is a wide range of activity and foraging toys available from bird boppers to treasure boxes and mazes, busy and play boxes. These can be viewed and purchased from www.myparrotshop.com which is a parrot supplies shop in Australia. A wide variety is also available from pet shops and super markets.
- Popcorn and whole peanuts in the shell can be scattered and hidden within the foliage and branches throughout the aviary to encourage foraging.
- Several food bowls can be placed throughout the aviary and their position changed.
- Fresh browse can be added to the enclosure every other day, this can be placed in tubes or piping filled with water. Flowering Eucalyptus and Grevillea are particular favourites. Spray with a hose when the weather is hot to keep them fresh.
- Dandelion and milk thistle flowers can be placed in the enclosure to encourage natural foraging activity.
- Soaked and sprouted seed combination of mungbean, sunflower, pepita or pumpkin, alfalfa, green lentils and millet seeds. Sprouts are living food providing vitamins, trace minerals, protein, antioxidants and chlorophyll.
- Ice blocks filled with fruit, chopped snow peas, mixed seeds and mixed chopped vegetables. These can be offered on hot days to help cool the birds down.
- They are mostly active at dawn and dusk, having a rest between mid-morning and mid-afternoon.
-

○ 9.2 Social Behaviour

- Princess parrots can be a very social species; they are not aggressive or viscous towards *Neophema* parrots, although they may inflict more subtle forms of stress such as chasing the smaller birds off perches and not allowing them to spend adequate time at the feeding stations.

- Outside aviaries provide the birds the opportunity to be social with wild birds, frequently chirping and whistling to the wild birds.
- Interacting with other species if in a mixed aviary. Keeps the birds active and entertained.
- Generally hand reared Princess Parrots do not have any behavioural problems, remaining friendly once placed into an aviary situation with other similar birds.
- Occasionally these parrots have been known to be flighty when first released into a large aviary, tending to fly directly into the ends of aviaries.
- Young birds will quieten down after a short period of time during an initial release period if hessian, shade cloth or cut branches are fixed at the ends of aviaries to prevent young fledglings from injuring themselves.

(Shephard,M 1989)(Sindel & Gill,2003)



Fig 37 Feeding table placed under cover within the aviary .Note the nesting box on the wall. Wirrimbirra Sanctuary Bargo. Photo S Flew

○ **9.3 Reproductive Behaviour**

- Provide with nesting box or hollow logs, privacy and a compatible mate.
- Provide nesting materials such as straw, hay or grass to enable parrots to construct a nest either within the nesting box or hollow logs.
- With the approach of the warmer weather in September the bonded pairs become active and vocal. Flying to and fro in their aviary while calling loudly, often to other pairs in the collection.
- Prior to the display, which may occur while perched or on the ground, the male will fly back and forth with his tail fanned, then approach the female with his eyes blazing as he dilates his pupils.
- Often wiping his beak along the perch and erects the feathers of the crown, while bobbing and hopping up and down.
- He then sleeks his feathers, holds his head high, and sometimes runs on the spot, making an unusual clacking noise and chattering with his beak.

- At times the female will solicit to be fed (courtship feeding) and sometimes copulation may occur.

(Sindel,S & Gill,J.2003)

○ **9.4 Bathing**

- Dust baths can be provided by placing dry soil in a shallow tray and put onto floor of enclosure.
- Water baths must be large enough for the bird to enter, allowing for their long tails.
- Water must be changed regularly, especially in the summer months, to prevent bacteria build up.

○ **9.5 Behavioural Problems**

- Feather plucking often a sign of boredom. Providing various enrichment every day will prevent this problem.
- Biting is a sign of aggression, provide something for the birds to chew on like browse, toys, fruit or paper should help.
- A guide to the general health of these birds can be ascertained by observing activity patterns.
- If the bird appears listless, unenthusiastic and fluffed up in the morning or evening it could indicate a health problem and a complete health check by a veterinarian is recommended.

(Shephard,M 1989)

○ **9.6 Signs of Stress**

- Thin body condition, feel the keel bone.
- Not eating.
- Quiet and listless.
- Fluffed up appearance.
- Discharges from cloaca, eyes or nostrils.
- If overheated, open mouth breathing from flying around.
- Shivering.
- Restless.

○ **9.7 Behavioural Enrichment**

- Food- cake. (see recipe Section 10.11)
- Chopped boiled egg.
- Seed sticks these can be purchased from pet shops and supermarkets.
- Meal worms.
- Various toys are available for small parrots through www.myparrotshop.com.au
- Change perches around enclosure.
- Introduce new branches and change the position around the aviary. around.

- Plant out fresh shrubs and grasses in the aviary.
- Scatter tray containing various seeds, nuts, popcorn, chopped fruit and vegetables placed on floor of enclosure to encourage foraging.
- Flowering *Eucalyptus* or *Grevillea* browse placed in tubes or piping filled with water and changed twice weekly.
- Mirror if individually housed.
- Whole fruit and/or vegetables (lettuce, spinach, capsicum with seeds, Chinese vegetables, corn cobs, broccoli, capsicum with seeds, green apple, melons)
- Sprouted seeds.
- Pick different grasses with seed heads and add to floor of aviary.
- Dust baths.
- See enrichment calendar fig 29.
- Water baths.
- Ice blocks filled with fruit, mixed seeds, chopped vegetables, snow peas and corn. These are a treat in the summer months to cool the birds down.
- Scrunched paper placed in the aviary or placed inside a water bottle which has several holes drilled in the sides. Chopped fruit, popcorn or unsalted nuts can be placed inside this bottle as well.
- Shell grit, dried and crushed egg shells and pieces of cuttlefish should be available in the aviary at all times as a dietary requirement.

1 chopped lettuce	2 scatter tray	3 pine cones	4 mealworms	5 popcorn	6 seed pods	7 whole fruit	8 sprouted seed	9 add hollows	10 bird cake
11 green apples	12 fruit ice blocks	13 training	14 rearrange perches	15 Seeded grasses	16 dust baths	17 new toys	18 Scatter food	19 Wattle seeds	20 Flowering browse
21 Change substrate	22 Spray with water	23 Different Sized water bowls	24 Sprouted seed	25 Browse With berries	26 Scatter tray	27 training	28 Bark and fresh grass	29 Milk thistle	30 Dandelion flowers

Fig 38 Enrichment calendar

○ **9.8 Introductions and Removals**

- Introduce new birds into the aviary after a period of quarantine.
- Place new bird in a small cage within the aviary (noegal cage) so other birds can meet him slowly and without harming the new occupant.
- Leave inside cage and observe the behaviour of the other birds to note any signs of aggression before releasing into the aviary with the other parrots
- If there already exists a bonded pair within the aviary its better to introduce a new pair to the aviary not a single individual.
- Princess Parrots are able to be housed individually but may require more stimulation from keepers, including the addition of mirrors, toys and other enrichment.(see fig 30 for ideas)

○ 9.9 Intraspecific Compatibility

- Within the species as in the relationship between male: male and female: female.
- When a female comes into oestrus, this affects the relationships with the other birds within the enclosure.
- Usually a compatible pair will spend time buddying up before reproductive behaviour begins; this will depend on the time of year and age of the birds.
- The relationships with other species within a mixed aviary will depend on the specific birds housed inside. These parrots tend to hold their own but can be harassed by the larger parrots especially at breeding time.
- They can subtly annoy smaller parrots by chasing them off perches and preventing them adequate time at the food bowl.

○ 9.10 Interspecific Compatibility

- Relationships between other species if housed in a mixed aviary.
- Princess Parrots have been successfully housed with birds from the *Neophema* genus (Australian small parrots) also Australian and foreign finches, doves and quails.
- The aviary must be large enough and contain sufficient branches and nesting boxes for the pairs to breed.
- Several feeding stations must be within the enclosure to enable all the birds' access to the seeds and fruit.
- Princess Parrots *Polytelis alexandrae* have hybridised with Regent Parrot *Polytelis anthopeplus*, Superb Parrot *Polytelis swainsonii*, Red-winged Parrot *Apromictus erythropterus*, Australian King Parrot *Alisterus scapularis*, Amboina or Moluccan King Parrot *Alisterus amboinensis*, Indian Ringneck Parakeet *Psittacula krameri* (see Fig 34) and Plum-headed Parakeet *Psittacula cyanocephala*
- Disease control including worming treatments given in the water and dusting with a Pyrethrum powder as a treatment for mites.
- These are required to be administered annually to all birds within the enclosure.

○ 9.11 Suitability to captivity

There are many advantages in keeping this delightful parrot, there are some disadvantages as well.

- The biggest problem is their susceptibility to contracting internal parasitic worms, as they spend a great deal of their time on the ground.
- Therefore they require regular worming.
- Advantages include reasonable cost, I purchased an adult male recently for \$100, cage included.
- They range from between \$60 to \$300 for sale on the internet and at pet shops.
- These parrots are extremely popular as an aviary kept species making them readily available.
- There are many parrot breeders in Australia selling various hybrid colours of Princess Parrots from blue, white to red and yellows and traditional multi coloured.

- They are not destructive chewers like the larger parrot species and can be housed in cheaper aviaries.
- They can be housed in small, medium and large flight aviaries.
- They don't tend to destroy the plants within the enclosure, therefore a planted aviary is appreciated.
- They are very friendly and sociable birds making them suitable companion pets, they can be taught to talk and whistle with patience, and they respond to their owners and keepers in a positive way. Therefore making them very suited to keeping in captivity.

(Sindel,S & Gill,J.2003) (Shephard,M 1989) (Forshaw,J 2002)
www.parrotsociety.org)(www.pbec.com)(www.enrichment.org/)

➤ 10. BREEDING

○ 10.1 Mating System

- Sexual dimorphism is pronounced in *Polytelis alexandrae*, with the male's tails longer and generally the plumage brighter than the females.
- Compatibility of pairs is desirable but not always essential. Incompatible pairs of *Polytelis* species often gradually accept each other and breed the next season.
- It is advisable to place newly formed pairs together a few months prior to the breeding season.
- During this lead up period new pairs should be monitored for any signs of aggression and stress and changes made where necessary.
- These birds breed in colonies in the wild, therefore the presence of other breeding pairs of parrots can stimulate breeding behaviour.

(Sindel & Gill,2003) (Macwhirter,P 1987) (Forshaw.J 2002) (Hocking,K 1990)

○ 10.2 Ease of Breeding

- All *Polytelis* species are established as domestic strains in Australian aviaries and as such are reliable parents.
- Colony breeding has been recorded for this species, ideally colony aviaries need to be large (5-6 m long and 0.9m wide, for each pair)) with plenty of well-spaced nest sites, as well as 2 or more feeding and watering stations.
- Generally 3 or more pairs are used to establish the colony.
- In the wild, colony breeding has been recorded with sightings of up to 10 pairs nesting in hollows in the same tree.
- The gentle nature of the Princess Parrot makes it an ideal species to include in a mixed breeding (with 1 or more pairs) in a large well-established planted aviary. They can be housed safely with finches, soft bills, doves, pigeons, peacocks and quails as well as non-aggressive parrot species such as *Neophemas* and other *Polytelis* genus.
- If housed with *Neophema* parrots they may inflict subtle forms of stress, like chasing the smaller birds off perches and away from the feeders.

(Shephard,M 1989) (Sindel & Gill 2003)

○ **10.3 Reproductive Condition**

- As the breeding season approaches the hens will begin to search the aviary floor for extra grit and minerals.
- Bonded pairs become active and vocal, with increased activity of both male and female by flying backwards and forwards in the aviary, increased vocalisation, courtship displays and interest in a chosen nest site
- Environmental triggers such as increased daylight hours rise in temperature, increased availability of food and water, nesting sites and suitable mates all stimulate reproduction.

(Macwhirter,P 1987) (Sindel & Gill 2003)



Fig 39 A Princess Parrot nesting locality, Butcher's Creek near Cloncurry, Queensland. (Sindel & Gill 2003)

• **10.3.1 Males**

- Males will call continuously either in flight or perching.
- The courtship display includes head bobbing, beak wiping, tail fanning, wing drooping, erection of crown feathers and hopping on the spot.
- Sleeking his feathers back while holding his head high, making a clacking chattering noise with the beak, flashing and dilation of the eye pupils to almost appear red, all the while becoming more active and vocal.
- He may roll his head and whistle to the hen, this performance is usually followed by an attempt to feed her, but not always copulation, which usually occurs very early in the morning and also carried out on the ground in many cases.

• **10.3.2 Females**

- Females will solicit feeding by crouching submissively on the perch with the head raised sometimes calling to the male, courtship feeding and sometimes copulation may follow.

- The white eggs are usually laid every other day and incubation lasts about 19day.

(Forshaw,J 2002) (Sindel &Gill,2003) (Wilson,K 1990) (Cayley,N 1973)(Hocking,K1990)

○ **10.4 Techniques used to Control Breeding**

- Varying the diet fed to change from non-breeding and to a breeding diet, following a period of moderate deprivation, would act as a trigger leading into the breeding season (see Breeding Diet)
- This is called flushing and for it to be effective, it is important that food intake is restricted prior to flushing. If birds are kept on a high level of nutrition at all times, flushing will not act as a stimulus for breeding.
- Foods used for flushing may include seeding grasses heads, sprouted seed, seeds with a high fat content like sunflowers, rape or nigger and live foods such as mealworms, white ants or other protein supplements like boiled egg or cheese.
- Separating the males from females would provide the most effective breeding control.
- The presence of rain puddles of water or spraying an aviary with a hose will encourage this species to breed as they evolved in the desert region of inland Australia. (Macwhirter,P.1987)



Fig 40 A pair nesting in a hollow

○ **10.5 Occurrence of Hybrids**

- Princess Parrots *Polytelis alexandrae* have hybridised with Regent Parrot *Polytelis anthopeplus* , Superb Parrot *Polytelis swainsonii* , Red-winged Parrot *Apromictus erythropterus*, Australian King Parrot *Alisterus scapularis*, Amboina or Moluccan King Parrot *Alisterus amboinensis*, Indian Ringneck Parakeet *Psittacula krameri* (see Fig 34) and Plum-headed Parakeet *Psittacula cyanocephala*
- Originating in Australia in 1951, the blue mutation is now numerous in collections.(see Fig 37)
- It is attractively coloured intones of blue and grey, with the normally pink markings being replaced by white.
- Pink colouration is retained in the lutino mutation, which remains rare.
- Two additional colour variations have appeared in Australia namely the red form and the blue bellied form.(see Fig 37)

(Sindel & Gill,2003) (Wilson,K 1990)(Forshaw,J 2002)



Fig 41 Princess Parrot x Indian Ring-neck Parrot (Photo Sindel & Gill 2003)



Fig 42 Cinnamon male (Photo Sindel & Gill 2003)



Fig 43 Cinnamon Blue (Photo Sindel & Gill 2003)



Adult blue pair (Photo Sindel & Gill 2003)



Cinnamon/yellow with lime wing (Photo Sindel & Gill 2003)



Cinnamon yellow/blue (Photo Sindel & Gill 2003)



Cinnamon/yellow (Photo Sindel & Gill 2003)



Acquired red (Photo Sindel & Gill 2003)

Fig 44 Various mutations

10.6 Timing of Breeding

Breeding	Clutch size	Clutch period	Incubation	Time in nest
Season	No of eggs	days	Before fledging	days
Sept to Dec	4 to 6	16 to 21	32 to 39 days	21

Fig 45 Species independence table

○ 10.7 Age at First and Last Breeding

- There are odd records of young females breeding during their first year.
- Usually females do not breed successfully until their second year, while young males are seldom fertile until the same age.
- Pairs have been recorded breeding between 18 and 23 years old.

(Sindel & Gill 2003)

○ 10.8 Ability to breed every year

- All *Polytelis* will produce 1 brood per year with *Polytelis alexandrae* recorded as producing a double brood per year.
- However, the breeding season may vary depending on the climatic conditions in a given year, for example dry climatic conditions may influence the *proximate stimuli*.

(Shephard, M 1989)

○ 10.9 Ability to Breed more than once per Year

- All *Polytelis* will produce 1 brood per year with *Polytelis alexandrae* recorded as producing a double brood per year.

○ 10.10 Nesting Hollows or Other Requirements

- *Polytelis* nest in the hollow limbs of native trees in the wild, mainly species of *Eucalyptus*.
- In captivity they will accept either natural hollow logs or artificial wooden nest boxes.
- Hollow logs have the advantage of being natural and perhaps more attractive in an aviary compared to nest boxes.
- Nesting boxes are generally constructed of dressed timber or plywood. You must ensure it is not made with treated timber as they may be chewed by the parrots and could be toxic if ingested.

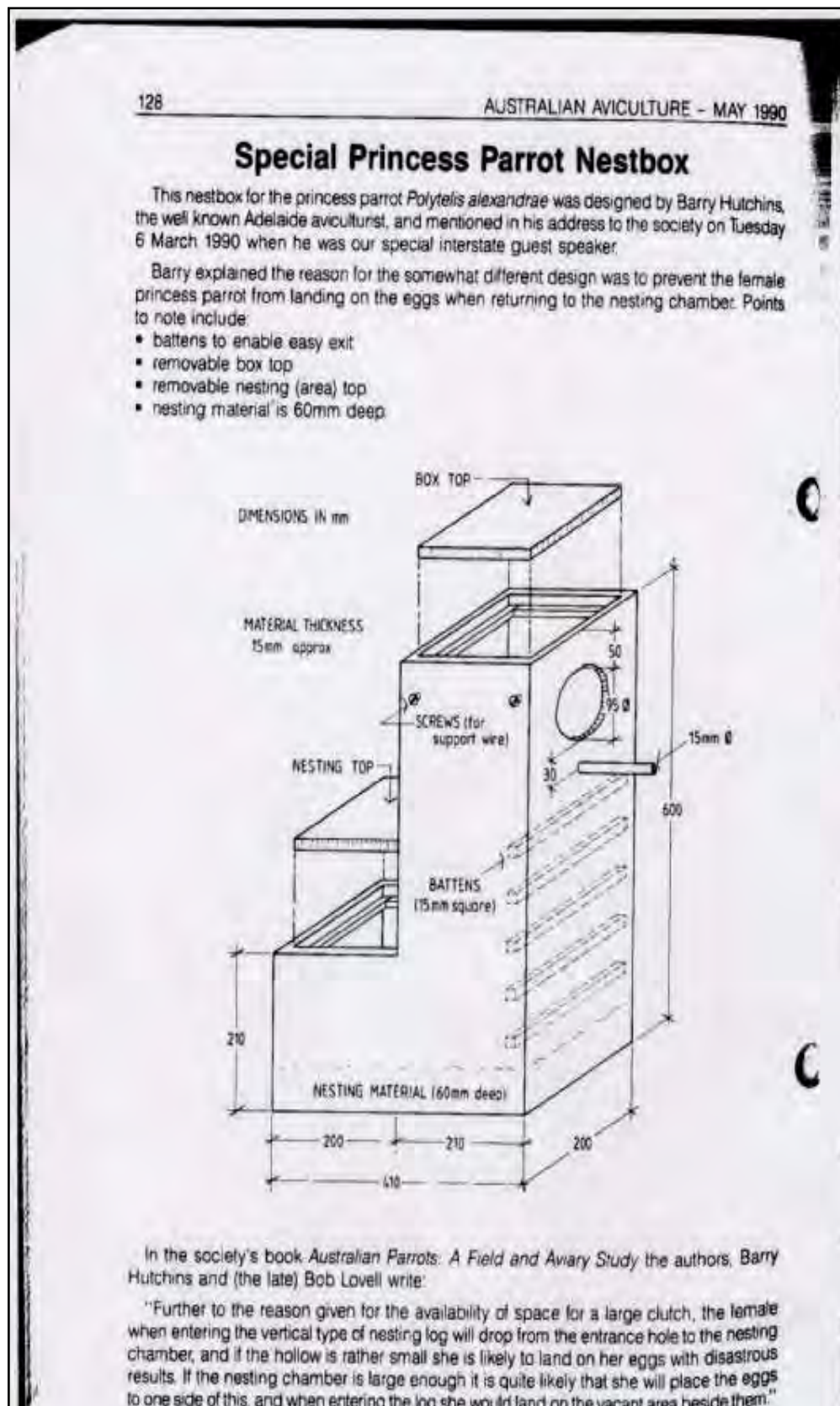


Fig 46 Drawing Barry Fielding East Doncaster Victoria
Australian Aviculture Vol 44, Issue 5, P 128 Special Princess Parrot Nest box

- The other advantages for nest boxes are that they are easy to obtain, prepare, clean, inspect, hang, replace and manoeuvre in an aviary.
- Size of box must be around 65cm deep X 18cm square with an entrance hole 65cm in diameter, hand at an angle of 45°
- An ideal nest box for *Polytelis* species is a vertical type (refer Figure 48) with the minimum measurements of 400-900mm in height, with an internal base of 200-300mm square with an entrance hole diameter of 75-100mm.
- There should be a removable lid for cleaning purposes, an inspection door, large enough to pass a hand through, about 100-150mm from the bottom, either on the side or front, and a perch or landing block near the entrance hole.
- Internal climbing cleats or a weld mesh wire ladder are essential to provide easy entry and exit from the nest box, but should end about 150mm above the nest filling to avoid any unfortunate accidents as nestlings grow.
- Ventilation holes about 10mm in diameter should be drilled in the sides of the nest box approximately 100mm above the nest filling to help to reduce internal temperatures during hot weather.
- Two or three nest boxes could be provided in an aviary to give breeding pairs alternatives to choose from for nesting.
- Alternatively suitable hollow logs may be used, these should be approximately 60-75cm long, with an internal cavity of 15-25cm. Closed at the bottom with a top that can be opened to allow for easy inspection of the eggs or chicks and hung at an angle of 22 – 45*, after having some substrate put into the bottom of the log.
- There should be an entrance hole on the front side near the top approximately 10-12cm across.
- It has been reported that these parrots will nest on the floor of the aviary, perhaps they nest in clumps of Spinifex grass at or near ground level in the wild.
- Generally the main requirements of a nest site for these species are acceptability by the birds, adequate size, good access for keepers and be easy to clean.

○ **10.10.1 Nesting materials/filling Substrate**

- The materials which have been successfully used for nest substrate are; peat moss, wood dirt, sand, sawdust (fine and untreated), pet litter, rice hulls, garden dirt, wood shavings or any mixture of these materials.
- An ideal mixture has been suggested as 75% peat moss and 25% wood dirt.
- Nesting materials should be lightly moistened and packed to a depth of 80-100mm.
- The female will spend several days working the filling and before she begins to lay her eggs.
- It is important for hygiene purposes to remove used nesting material and replace with fresh material between clutches.

○ **10.10.2 Installing nesting facilities**

- Nest boxes should be hung in the covered section of an aviary, as high as possible but still accessible for inspections to be carried out.
If there is an enclosed rear service walkway to an aviary it may be possible to have nesting boxes hung outside an aviary with an accessible entrance hole for the birds. (Shephard, M 1989) (Sindel & Gill, 2003)

- This system would provide fewer disturbances to breeding birds by reducing the necessity to enter aviaries for nest box inspections.
- It is possible to leave nest boxes in aviaries all year round but preference is given to removing nest boxes at the end of each breeding season to ensure nest boxes are completely cleaned ready for the following season.

(Shepherd,M 1989)

○ 10.11 Breeding Diet

- Princess Parrots have a tendency towards obesity, which is influenced by diet and the degree of restriction of flight imposed by their housing.
 - To reduce this excess weight problem it is advised that a non-oily, low fat seed diet should be provided, by using any or all of the many varieties of millet seeds.
 - French white millet, after many years of experimentation has emerged as the most suitable and preferred millet of the group.
 - Dry seed should only be considered as supplementary to a daily ration of green feed, sprouted seed, vegetables and fruit.
 - The regular inclusion of fattening or oily seeds such as sunflower seed, canary seed or oats, in a *Polytelis* diet can only lead to obesity and associated health problems.
 - Such food items should only be fed on a limited basis just prior to the nesting season to promote breeding condition and fed in unlimited quantities to breeding pairs rearing young.
 - Over weight birds are not healthy birds and they are usually poor breeders as obesity adversely affects fertility and predisposes to egg binding.
- (Sindel & Gill,2003)



Fig 47 Fresh fruit and seeding grasses Photo S Flew

The following all year round diet is suggested to assist in over coming any obesity problems with *Polytelis*, especially leading into and during the breeding season:

- Dry seeds:

Feed daily - (Non-oily, low fat) French white millet (main base seed – unlimited quantity), Japanese millet, panicum, and red millet.

Feed limited quantities prior to breeding season and unlimited to pairs with young - (Oily) Canary seed, sunflower seed, safflower, and hulled oats.

- Sprouted seeds:

Feed daily - (Unlimited) All millets.

Feed limited quantities - (Few dozen seeds per pair per day - increase quantity a few weeks prior to nesting season to stimulate breeding and unlimited to pairs feeding young) Canary seed, sunflower seed, safflower, hulled oats.

- Live food:

Feed weekly – Mealworms, our Parrots have been seen eating day old chicks left over from feeding the Tawny Frogmouths in the mixed flight aviary.

- Supplementary protein:

Provided in baked nutritional cake (see recipe below)

- Vegetables and pulses:

Feed daily - Silver beet, celery, endive, cabbage, carrot, cabbage, beans, cauliflower, broccoli, lentils, mung beans and leafy Chinese vegetables.

Peas, lentils and beans can also be offered sprouted daily.

- Greenfeed:

(Offered when in season, correctly identified and if the source is guaranteed not to have been sprayed with chemicals) Seeding heads of summer grass, winter grass, water millet, oats, milk thistle, chickweed, dandelion, pigweed and dock.

Seeding heads of sown grains: Millets, oats, canary seed.

- Fruit:

Feed daily –green apple, pear, stone fruits, strawberries and any of the vine or bush berries.

- Hawthorn, pyracantha and cotoneaster berries can also be fed if not sprayed with any chemicals.
- Cuttlefish bone or shell grit must be available prior to egg laying and while young are being reared to provide adequate Calcium. Fresh clean water should be available daily.

Additional supplement of a baked nutritional cake with the following ingredients:

2 Cups of oats	2 Cups of dried milk powder
2 Cups of whole meal flour	1 Cup of Soya flour
1 Cup of crushed mixed nuts	½ Cup of rice cereal
4 Tablespoons of peanut butter	4 Tablespoons of wheat germ
6 Tablespoons of honey	4 Teaspoons of calcium carbonate
6 Eggs	

Non-breeding birds should get a piece of the cake once a week while pairs with young should receive one to two pieces of cake per day. (A piece of cake is approximately a 2.5cm square.)

- Sunlight: Required by all parrots to convert provitamin D to D3 and necessary for the absorption of calcium.

- Flowering *Eucalyptus* and *Grevillea*:

Branches from these plants should be supplied when in season to provide environmental enrichment.

- a) The above mentioned balanced diet will provide the vitamins and minerals required
- b) It will also provide variety to stimulate behavioural and physical activity with the various food shapes, sizes, textures and tastes.
- c) All the foods listed should be alternated each day primarily to maintain variety but also for the cost and efficiency of feeding.

(Forshaw,J 2002) (Macwhirter,P.1987) (Sinde& Gill,2003) (Wilson K.1990)



Fig 48 Fresh browse can be placed in piping or tubes filled with water to maintain freshness
Photo S Flew

○ **10.12 Incubation Period**

- Incubation is carried out by the female only and usually commences with the laying of the second egg.
- Unusually short and variable incubation periods of 16,17,18,19 and 20 days have been recorded.
- Records show that in dry seasons such as spring and summer of 2001, in Sydney most Princess parrot eggs hatch in the shorter time.
- Perhaps shorter incubation periods of desert species during dry times suggest low humidity reduces the length of the incubation period.

○ **10.13 Clutch Size**

- The most commonly recorded clutches were of 4 to 6 eggs.
- White and varying in form from elliptical to rounded-oval, shell close grained, smooth and lustrous.

(Sindel & Gill,2003)

○ **10.14 Age at Fledging**

- Fledging periods of 32 days to 39 days from 23rd October to 5th March have been recorded.
- Fledging is a critical period for young birds which are aviary bred as they often leave their hollow and shoot out like rockets with the parents following behind trying to guide them into the foliage of a tree where they can land softly and safely.
- Hanging hessian cloth inside the front of the aviary or placing foliage on the inside of the front wire mesh and to the rear wall of the aviary will restrict vision

to the outside and darken the interior, also providing some roosting protection for the fledglings and reduce injuries.

○ **10.15 Age at Removal from Parents**

- The young leave the nest similar in appearance to adult females and are often independent of their parents as early as 2 weeks after fledging, although at least 3 weeks with their parents is advisable.

(Sindel & Gill, 2003)(Cayley,N,1973)

○ **10.16 Growth and Development**

- The chicks hatch with wispy pale grey down feathers which are denser on the lower body with orange beaks.
- At 9 days old, early pin feather development is visible on the wings and tail, while the slightly darker grey secondary down us starting to appear and the eyes have opened.
- When 16 days old the young are half feathered and at 23 days they are three-quarter feathered, then at 30 days the youngsters are fully feathered and almost ready to fledge.
- As soon as hatching has occurred, routine daily nest inspections are recommended and where possible twice daily.
- This allows any potential problems to be solved before they become disasters.

(Sindel & Gill,2003)



Fig 49 Princess Parrot chicks Photo Google images



Recent hatchlings (Photo S Sindel & J Gill ,2003)



Nestlings 7-12 days old (Photo S Sindel & J Gill ,2003)



Nestlings 14-19 days old (Photo S Sindel & J Gill ,2003)



Nestlings about 30 days old almost ready to fledge, lower right (Photo S Sindel & J Gill , 2003)

Fig 50 Examples of growth and development with *Polytelis alexandrae* chicks three 15 days old and one 12 days old showing early pin feather development and secondary grey down in the older chicks.

➤ 11. ARTIFICIAL REARING

○ 11.1 Incubator Type

Good hatching results have been obtained using a “Rotarex” brand of incubator manufactured in New Zealand by Dominion Incubators Pty Ltd.



Fig 51 Rotarex incubator SI 12M2 has the capacity to incubate 30 parrot eggs.
(www.dominc.nz)

○ 11.2 Incubation Temperature and Humidity

- The normal incubator operating temperature for parrot eggs is 37.2°C, although temperatures of 0.2°C higher or lower than 37.2°C have also been successful.
- A relative humidity of 55% is advisable which is equivalent to a wet bulb thermometer reading of 29°C to 31.2°C.

○ 11.3 Desired % Egg Mass Loss

- The theoretically accepted ideal weight loss for eggs is 16% during an entire incubation period.
- This is calculated by dividing the initial weight of the fresh egg by 6.25 to establish the preferred 16% overall weight loss, which then should be divided by the number of days in the normal incubation period for the particular species, to ascertain the ideal weight loss per day.

○ 11.4 Hatching Temperature and Humidity

- There is no specific information relating to hatching temperature but an incubator is most probably maintained at the incubation temperature of 37.2°C.
- Ideally, three days prior to the eggs hatching the humidity of an incubator should be increased to 75% or 33.3°C on a wet bulb thermometer.
- However, 60% humidity has been successful when used for mixed species egg incubation and hatching. (Sindel & Gill, 2003)

○ **11.5 Normal Pip to Hatch Interval**

No information available specific to *Polytelis*.

○ **11.6 Brooder Types/ Design**

- No information available on specific brooder types for *Polytelis* but any brooder should be designed to ensure that the chicks have no contact with the heat and humidity sources.

(Low R. 2004)

○ **11.7 Brooder Temperatures**

- Brooders should be maintained at a Temperature of 36°C and at 30% Humidity, if the brooder is humidity controlled.
- Other wise a small open container of water about 10cm in diameter placed in the brooder will provide sufficient humidity to prevent dehydration of chicks.

(Sindel & Gill ,2003)

○ **11.8 Diet and Feeding Routine**

- Feeding should commence about 2 hours after hatching and continue at 2 hour intervals until 10.00 p.m. approximately, then during the night feed at 2.00 a.m. and then commence the 2 hourly feeding at 6.00 a.m.
- During the first few hours or until the chick passes its first motion, feed only hydrating fluids, such as Gastrolyte or Polyaid mixed with Hand-rearing formula mixed into a runny consistency.
- This fluid mixture should be fed for the first 3 days while gradually increasing to a thicker consistency to 30% solids.
- Then the Gastrolyte is discontinued and replaced with cooled boiled water for the remaining rearing period.
- When seven days old the 2.00 a.m. feed can be discontinued, allowing the chick's crop to empty overnight.
- As the chicks grow so does the capacity of the crop capacity and the food intake increases while the duration between feeds is extended to 3 hours then 4 hours and so on.
- Generally the feeding intervals are determined by the speed of the crop emptying.
- The hand rearing diet is changed at 7 days old to the hand rearing recipe specified above.
- The hand rearing food should be fed at a temperature of 42.7°C for very young chicks, gradually reducing to 40°C for older chicks.
- Hand rearing diet for day one to seven-day-old chicks: It has been indicated that currently the best results when rearing day one to seven-day-old chicks is gained by the use of commercially prepared diets such as Lakes Hand-rearing Formula or Wombaroo "granivore".

- As soon as chicks are started on a hand rearing food it is advisable to introduce digestion-assisting bacteria into their crop as in *Lactobacillus acidophilus*. Enough of the product to cover the head of a match in a level teaspoon of rearing food in each feed for two days is sufficient to introduce the desired bacteria.
- Hand rearing diet for chicks over seven days: The following hand rearing recipe has provided optimum growth rates for *Polytelis* species:

1 cup ground chicken starter crumbles approx 20% protein
 1 cup egg and biscuit canary rearing food or preferably ¼ cup of whole egg powder
 1 cup of sunflower meal
 1 cup Farex baby cereal or Heinz High Protein Baby Cereal (av supermarkets)
 1 level teaspoon of multi-vitamin and mineral powder
 1 level teaspoon of calcium carbonate powder

The dry mix is best stored in an airtight container and kept in a cool place.

To prepare the mix for feeding add boiled water and allow to cool to a temperature of about 40°C so as not to burn the chicks.

A few drops of a liquid vitamin supplement such as Penta-vite or Avi drops are added to one feed each day.

- Normally weaning off the hand-rearing diet would take place at about 8 to 10 weeks of age. This may vary between individual young birds.
- The first indication that the birds are ready to be weaned is their growing lack of interest in the hand-rearing food.
- When this behaviour begins a variety of appropriate foods can be placed in a shallow dish in the young bird's brooder or cage for them to start to experiment with. Soft foods are ideal such as corn kernels, peas, spinach, soft pear, carrot, and sprouted mung beans should all be offered in small-diced pieces.
- A pre-soaked parrot mix containing sunflower, canary seed, oats and millets can also be offered. The soaking makes the seed husks easy to break and weaning parrots will soon learn to extract the flesh, play with it for a while and then experiment with chewing it.
- Hand-rearing food should be gradually reduced in quantity and regular feeds per day cut down to once daily.
- Preferably the daily feed should be in the evenings to ensure young birds have sufficient food in their crops to sustain them through the night.
- The reduction in hand-rearing food will also encourage the young birds to feed themselves.
- When the young birds have been observed, eating and swallowing properly and there is at least 1 level teaspoon of food in their crops during the late afternoon hand feeding should cease.
- However, close monitoring of food intake should take place for several days to sure that the young birds are definitely feeding themselves.

Low R. 2004 'Hand rearing Parrots in Australia.' Australian Birdkeeper, Vol 17 (2) pp. 77-83.

(Sindel & Gill 2003) (Wilson K.1990)

Hand Rearing Diets

Hand rearing diets have been specifically designed to meet the nutritional needs of developing chicks. Pretty Bird, Harrison's Bird Products, and Vetafarm have all developed hand-rearing diets that address nutritional requirements by promoting increased digestibility and solution consistency.

Both Harrison's and Vetafarm now produce a neonate formula which has shown to be excellent for newly hatched psittacines and passerines. A balanced diet is essential when rearing birds by hand. Pretty Bird Ltd, Harrison's Bird Foods, and Vetafarm are companies specializing in the successful development of hand rearing diets. (see Appendix for supplier details)

Extruded Diets

The availability of commercially produced avian diets in Australia has increased over the last several years. This has been a direct result of the increased research and breeder demand. These nutritionally balanced diets are presented in pellet form.



Fig 52 Pretty Bird hand rearing formula



Fig 53 Pretty Bird weaning formula



Fig 54 Harrison hand rearing formula



Fig 55 Vetafarm hand rearing formula

○ **11.9 Specific Requirements**

- Newly hatched chicks should remain in the plastic mesh hatching basket in the incubator for the first 24 hours and then moved to an accurate temperature controlled brooder, maintained at 36°C.

○ **11.10 Pinioning Requirements**

- A surgical procedure performed on a bird's wing to render the bird permanently incapable of flight. The operation typically involves amputation of that part of the wing from which the primary feathers grow, by severing the second and third metacarpal bones, this is usually only performed on one wing.
- Feather clipping involves the cutting of the primary feathers, rendering the bird temporarily incapable of flight, until the feathers are replaced at the next moult.
(www.dpi.gov.nsw)

○ **11.11 Data Recordings**

- Through close observation the signs and symptoms of ill health can be recognised early and appropriate action can be taken.
- In relation to breeding, observations will assist with compatibility of potential breeding pairs.
- Aggression and fighting between birds can be detected quickly through regular observations and the offending birds can be relocated before any physical injuries occur.

- The advantages of detailed record keeping are numerous. For example, the age and breeding capacity of each pair of birds is known.
- If details of parentage are kept, there can be more certainty in making new unrelated pairs with young birds
- Record keeping can be as simple as keeping a daily diary either of individual pairs of birds or of a whole collection.
- Notes or diary entries could then be developed into an indexed card system where individual birds or pairs each have a card.
- Information to be recorded can include:
 - Aviary Number and Species occupying the aviary
 - History of the parents, i.e. age, origin, ring number and/or colour
 - Details of current and previous breeding seasons:
 - Date and month breeding commenced
 - Clutch number
 - Number of eggs laid
 - Date eggs hatched
 - Date young fledged
 - Number fledged
 - Date young were independent
 - Outcome of young, i.e. Sex, ring number/colour, who they were paired to
 - General remarks such as illnesses and any veterinary treatment administered.

(Shephard,M 1989)



Fig 56 Note the red metal leg band is on the birds right leg indicating this is a cock bird.
Photo S Flew

○ 11.12 Identification Methods

- An important part of record keeping is the ability to be able to readily identify individual birds in a collection.

- The fitting of leg rings on aviary birds facilitates identification.
- There is a large selection of both split, closed, plastic and metal rings available.
- Split rings can pose a danger to birds by any sharp edges either injuring birds or getting caught on aviary wire or any protruding object
- Parrots are capable of removing split rings. The most appropriate identification method for birds the size of Princess Parrots are closed metal rings, which have the advantage of being engraved with information relating to an individual bird.
- The year a bird was breed and identification of origin can be provided engraved on closed metal rings.
- The appropriately sized closed metal rings for *Polytelis* should be placed on the legs of chicks at about day eight after hatching.
- A band must be the correct size and shape.
- Size 10 aluminium urst or steel closed/split rings are usually used for this species.

(Macwhirter,P 1987) (Shephard,M 1989)(www.parrotsociety.org)

○ 11.13 Hygiene

- If attention is paid to good hygiene through out the period of hand rearing there should be very few problems experienced.
- General hygiene should include cleaning of hands before and after handling and feeding young birds, using a chlorhexidine wash.
- Hands should be scrubbed for at least five minutes, as most disinfectants need 5-10 minutes of contact to effectively clean hands.
- All feeding utensils should be cleaned with disinfectant after each feed.
- To stop any possible infection spreading feeding utensils should be cleaned between feeding each individual chick if several chicks are being hand reared at the same time.
- Incubators, brooders, holding containers and weaning cages should be disinfected before, during and after use.
- If paper is used to cover surfaces it should be changed daily. Any tissues or any other material used to provide warmth and pack out holding containers should be changed regularly if soiled by the chicks.
- During the entire hand-feeding period the chicks must be wiped clean of any excess food after each feeding with tissues or toilet paper.
- Effective disinfectants that are safe to use by humans and with young birds are; chlorhexidine sold as Aviclen, Hibiclen, Hibitane or Nolvosan, chloramines sold as Halamid or Halasept and sodium hypochlorite a common form of chlorine used at a 5% dilution rate.(see Appendix section)

Low R. 2004 'Hand rearing Parrots in Australia.' Australian Birdkeeper, Vol 17 (2) pp. 77-83. (Sindel & Gill 2003) (Cannon,M 1996)

○ 11.14 Behaviour considerations

- Hyperactivity and blood flecking have been recorded as problems with *Polytelis* chicks from about five to ten days old in brooders.

- The first indications are constant movement of the chick and fine blood flecks on the paper lining of the brooders.
- The bleeding is the result of constant movement of the chick on abrasive paper such as paper towel and toilet paper.
- Confining the chick in a container lined with shredded paper, seems to comfort and settle the chick as it huddles up to or under the paper similarly as it would a brooding hen.
- This behaviour may be temperature related as adjusting the brooder temperature until the chick appears more settled and comfortable tends to resolve the problem.
- Alteration to the diet and increased food input is also indicated as being of benefit to this type of problem.
- Generally hand reared Princess Parrots do not have any behavioural problems still remaining friendly once placed into an aviary situation with other similar birds.
- Occasionally these parrots have been known to be flighty when first released into a large aviary, tending to fly directly into the ends of aviaries.
- Young birds will quieten down after a short period of time during an initial release period if hessian, shade cloth or cut branches can be fixed at the ends of aviaries to prevent young fledglings from injuring themselves. This provides a barrier and will prevent them from flying into the wire.

(Low R. 2004) 'Hand rearing Parrots in Australia.' Australian Birdkeeper, Vol 17 (2) pp. 77-83.

(Sindel & Gill 2003) (Wilson K. 1990)

○ 11.15 Use of foster species

- Each of the species of *Polytelis* makes good foster parents and are generally safe for cross fostering, although constant monitoring of untried pairs is advisable.
- *Psephotus haematonotus* (Red-rumped Parrot) are usually good foster parents for all the *Polytelis* species; this is providing that there are not too many young in the nest and they do not grow beyond the capabilities of the smaller foster parents.
- Foster parenting is a viable rearing option commonly used for various reasons including: desertion of chicks, fostering small clutches into other nests to free the pair allowing them to breed again, using reliable parents to rear the young of unreliable parents or to increase the production.
- Generally Princess Parrots make good foster parents but regular monitoring of untried pairs is advisable.
- Fostering has one major risk, as there is always the chance of transferring infections from one nest to the other.



Fig 57 Red Rumped Parrot Photo Google images

○ 11.16 Weaning

- Hatchlings are usually fed by the female only for about 10 days
- Most males assist with feeding the young after the first week or two.
- Normally weaning off the hand-rearing diet would take place at about 8 to 10 weeks of age. This may vary between individual young birds.
- The first indication that the birds are ready to be weaned is their growing lack of interest in the hand-rearing food.
- Weaning is a gradual process which is initiated by the chick when fully feathered and ready to fly.
- The youngster reduces its food intake dramatically, to lose body weight to enable it to fly.
- At this stage it should be placed in a small indoor holding cage with a variety of foods available including dry seeds, sprouted seeds, green peas, green feed, seeding grasses, milk arrowroot biscuits, plain cake and green apple.
- Hand feeding should be gradually reduced to once daily.
- When the bird is feeding itself on a regular basis it can be moved to a larger holding cage and then after about 2 weeks to a small sheltered holding aviary.
- Remembering to take each progressive step slowly and be prepared to retrace a step if necessary.
- Daily monitoring of the birds weight is a reliable guide to its progress.



Fig 58 Small holding cage Photo S Flew

○ 11.17 Rehabilitation Procedures

- If an injured, sick or orphaned Princess Parrot was found and handed into your Park by a member of the public, this bird must be examined by a Veterinarian and if it has no injuries given to a licensed bird carer with a reputable wildlife rescue organization such as WIRES.

- If it has injuries and requires going into care, a qualified, experienced carer shall house it and feed it until it returns to health. Then it shall be assessed by a Vet prior to release.
- It shall be assessed for rehabilitation and release back to the rescue location, once eating its natural diet.



Fig 59 Wild life hospital with cages covered to keep birds warm, dark and quiet
Photo S Flew

Low R. 2004 'Hand rearing Parrots in Australia.' Australian Birdkeeper, Vol 17 (2) pp. 77-83.
(Sindel & Gill 2003) (Wilson, K.1990) (Macwhirter,P. 1987) (Shephard,M 1989)
(Parsons, H1999)(White,S 1997)

➤ 12. ACKNOWLEDGEMENTS

All the volunteers at Wirrimbirra Flora and Fauna Sanctuary Bargo NSW
 Rae Dutton for proof reading this document
 National Zoo and Aquarium Canberra ACT keepers
 Peggy MacDonald WIRES Wingecarribbee Bird coordinator

➤ 13. REFERENCES

- ❖ ARAZPA guidelines for transport.
- ❖ International Air Transport Association Booklet Live Animal Regulations 27th Edition 2000
- ❖ TAFE Standard Operating Procedures for Birds
- ❖ *Disease and Threatened Birds* (1989). J.E.Cooper, (ed.) Proc. Symp. XIX World Conference. of the International Council for Bird Preservation, June 1986,Queens Univ. Kingston, Ontario, Canada 32 Cambridge CB3 OPJ, England. Publication No: 10, *International Council for Bird Preservation*, **32**, Girton, Cambridge, CB3 OPJ, England.
- ❖ Norton, T.M., (1995). Revision of Report of the Subcommittee on Velogenic Viscerotropic Newcastle Disease Virus. In: AAZV *Infectious Diseases Notebook*.
- ❖ *Avian Medicine* (2000). J. Samour, (ed.) Harcourt Health Sciences, 625 Walnut St, Philadelphia, PA 19106-3399, USA Pp.427
- ❖ Compendium of measures to control *Chlamydia psittaci* infection among humans (Psittacosis) and pet birds (Avian chlamydiosis). Centers for Disease Control (CDC) and Prevention.
- ❖ Gerlach, H. (1986). *Viral diseases*. In: Harrison, G. J. and Harrison, L. R. (eds.) *Clinical Avian Medicine and Surgery*. W.B.Saunders Co., Philadelphia, Pennsylvania, USA. Pp. 408-433.
- ❖ Gerlach, H. (1994). *Viruses*. In: Ritchie, B.W., Harrison, J. and Harrison, L.R.(eds.) *Avian Medicine: Principles and Application*. Wingers Publishing, Inc. Lake Worth, Florida, USA. Pp. 862-948.
- ❖ Barker J., Johnson K. and Lees C. (ed.) (2003) *Australasian Species Management Program: Regional Census and Plan*. 13th edition. Mosman: Australasian Regional Association of Zoological Parks and Aquaria.
- ❖ Higgins P J (Senior Ed) *Handbook of Australian, New Zealand & Antarctic Birds* Vol 4 Parrots-Dollarbirds Oxford University Press Birds Australia (1999)
- ❖ Mitchell Beazley *The Complete Guide to Pet and Aviary Bird Care*
- ❖ Dr Michael H Woodford *Quarantine and Health Screening Protocols for Wildlife prior to Translocation and Release into the wild*.
- ❖ Cannon MJ *A Guide to Basic Health & Diseases in Birds* (1997)
- ❖ Forshaw Joseph.M. *Australian Parrots*. (2002)
- ❖ Macwhirter P *Every Bird A Guide to Bird Health* Inkata Press (1987)

- ❖ Shephard M *Aviculture in Australia Keeping & Breeding Aviary Birds* (1989)
- ❖ Sindel Stan and Gill James *Australian Coral-billed Parrot* Singel Press Australia (2003)
- ❖ Low R. 'Hand rearing Parrots in Australia.' *Australian Birdkeeper*, Vol 17 (2) pp. 77-83.(2004)
- ❖ Wilson K A *Guide to Australian Long & Broad-tailed Parrots and New Zealand Kakarikis: Their Management, Care & Breeding.* (1999)
- ❖ Cayley Neville W *Australian Parrots in Field and Aviary* Angus & Robinson Sydney (1973)
- ❖ Readers Digest *Reader's Digest Complete Book of Australian Birds* Sydney (1979)
- ❖ Heather Parsons *Caring for Australian Native Bird* Kangaroo Press East Roseville Australia(1999)
- ❖ Graham Pizzey & Frank Knight *Field Guide to Birds of Australia* Harper Collins Sydney (1997)
- ❖ Ken Simpson & Nicolas Day *Field Guide to the Birds of Australia* Penguin Group Australia (2004)
- ❖ Michael Moorecombe *Field Guide to Australian Birds* Steve Parish Publishing Australia (2003)
- ❖ Steve Parish *Wild Australian Guide to Parrots* Steve Parish publishing, Brisbane (2008)
- ❖ Neville Cayley *What Bird is that?* Angus & Robinson Sydney (1969)
- ❖ Stanley J. Palmer *Palmer's Manual of Trees, Shrubs and Climbers* Lancewood Publishing Queensland Australia (1990)
- ❖ Les Robinson *Field Guide to the Native Plants of Sydney* Kangaroo Press Kenthurst Australia (1997)
- ❖ Francis Bodkin Collins *Encyclopaedia Botanica* /Angus and Robinson North Ryde Australia (1999)
- ❖ Geoff Bryant *Encyclopaedia of Australian Native Plants* Random House Milson's Point Australia (2005)
- ❖ Nancy T. Burbidge *Australian Grasses* Angus and Robinson Sydney (1970)

www.therebelgardener.com.au

www.plantfile.com.au

www.wikipedia.com.au

www.avainbiotech.com/Diseases/PBFD.htm

numbat.murdoch.edu.au/caf/pbfd.htm

www.dpi.nsw.gov.au

www.birdcare.com.au

www.environment.gov.au/biodiversity/threatened/species/pubs/758-conservation-advice_pdf

www.trill.com.au

www.parrothaven.com.au

www.parrotsociety.org.au

www.worldparrottrust.com

www.deh.gov/biodiversity/threatened/publications/tap/beak-feather/pubs/beafeather-tap.pdf

www.priampsittaculturecentre.com.au

www.IATA.gov.nsw.au

www.cities.org
www.ozanimals.com
www.dominc.nz
www.vetafarm.com.au
www.animalhealthaustralia.com.au
www.environment.gov.nsw.au
www.myparrotshop.com.au

E-Journals

Title: [Special princess parrot nestbox.](#)

Author(s): Anonymous

Source: **Australian Aviculture** Volume: **44** Issue: **5** Page(s): **128** Published: **1990**

Title: [The princess parrot.](#)

Author(s): Hocking, K.

Source: **Bird Keeping in Australia** Volume: **33** Issue: **6** Page(s): **81-87** Published: **1990**

Title: [Colony breeding princess parrots.](#)

Author(s): Anonymous

Source: **Australian Aviculture** Volume: **41** Issue: **8** Page(s): **191-196** Published: **1987**

➤ 14. BIBLIOGRAPHY

- ❖ Peter Slater *A Field Guide to Australian Birds* Vol 1 &2 Rigby Ltd Australia (1979)
- ❖ DC Blood & Virginia P Studdert *Bailliere's Comprehensive Veterinary Dictionary* Bailliere Tindall London (1996)
- ❖ Philip Street *Animal Reproduction* David & Charles London (1994)
- ❖ Martin Goldstein DVM *The Nature of Animal Healing* Alfred A Knoff USA (1999)
- ❖ Steve Parish *Handbook of Australian Wildlife* Steve Parish Australia (2003)
- ❖ Donald & Molly Trounson *Australian Birds* 4th Ed Murray David Australia (1989)
- ❖ Steve Parish *Amazing facts about Australian Birds* Steve Parish Australia (1997)
- ❖ Ken Stepnell & Jane Dalby *Australia's Birds* National Book Distributors and Publishers Australia (1996)
- ❖ Sainty & Associates *Burnum Burnum's Wild Things* Sainty Australia (2000)
- ❖ Juliette De Bairacli Levy *Herbal Handbook for Farm & Stable* Faber & Faber USA (1976)
- ❖ Margaret Hodgson & Roland Paine *A Field Guide to Australian Wildflowers* Vol 1 &2 Rigby Publishers Australia (1987)
- ❖ Gill Frank B *Ornithology* 3rd Ed Tenney S New York c2007
- ❖ David Attenborough *Discovering Life on Earth* Collins London (1981)
- ❖ Keith Hindwood *Australin Birds in Colour Reed* Australia (1967)

Title: [A literature summary of the princess parrot *Polytelis alexandrae* and a suspected recent breeding event in South Australia.](#)

Author(s): Baxter, Chris; Henderson, Rod

Source: **South Australian Ornithologist** Volume: **33** Issue: **6** Page(s): **93-108** Published: **November 2000**

Title: [The princess parrot.](#)

Author(s): Hibbert Eltham, Charles

Source: **Bird Keeping in Australia** Volume: **42** Issue: **1** Page(s): **1-6** Published: **January 1999**

Title: [My experiences with princess parrots.](#)

Author(s): Hilton, Martin

Source: **Bird Keeping in Australia** Volume: **39** Issue: **11** Page(s): **173-176** Published: **November 1996**

Title: [The *polytelis* parrots. Princes - Regent - Superb.](#)

Author(s): Girvan, Geoff

Source: **Australian Aviculture** Volume: **49** Issue: **4** Page(s): **83-89** Published: **April 1995**

Title: [Alexandra's or princess parrot.](#)

Author(s): Carter, Mike

Source: **Wingspan** Volume: **12** Page(s): **32-35** Published: **December 1993**

Title: [Breeding the princess parrot.](#)

Author(s): Hauser, D.

Source: **Australian Aviculture** Volume: **44** Issue: **4** Page(s): **90-92** Published: **1990**

Title: [Alexandra's or princess parrot.](#)

Author(s): Carter, Mike

Source: **Wingspan** Volume: **12** Page(s): **32-35** Published: **December 1993**

Title: [Breeding the princess parrot.](#)

Author(s): Hauser, D.

Title: [Background notes on the princess parrot.](#)

Author(s): Hyde, Graeme

Source: **Australian Aviculture** Volume: **60** Issue: **9** Page(s): **184-189** Published: **September**

Title: [The princess parrot.](#)

Author(s): Hibbert Eltham, Charles

Source: **Bird Keeping in Australia** Volume: **42** Issue: **1** Page(s): **1-6** Published: **January 1999**

Title: [The princess parrot and its survival.](#)

Author(s): Emmett, C.F.

Source: **Australian Aviculture** Volume: **41** Issue: **4** Page(s): **93-98** Published: **1987**

Title: [The Princess of Wales' Parrakeet \(*Polytelis alexandroe*\).](#)

Author(s): Astley, H. D.

Source: **Aviculture. Mag.** Volume: **(2)** Issue: **iii** Page(s): **pp. 248 & 249** Published: **1905**

➤ 15. GLOSSARY

Allopreening: preening of one bird by another.

Class: the division of classification into which is placed the whole of a significant group of organisms.

Camouflage: colouring, markings or outline which hides a bird in a particular place.

Colour morph: different colouring within a single interbreeding population, unrelated to season, sex or age.

Coverts: small feathers over and protracting the bases of larger ones; lesser, median, greater coverts.

Dimorphism: sexual- occurrence of two distinct types of difference between the sexes of the same species.

Displays: behaviours which birds use to communicate with other birds. Involves song, movements, plumage.

Dominant: First in importance.

Endemic: native to, or peculiar to, a particular or defined area, and breeding only there.

Family: the division of classification into which an Order is divided and which has one or more genera.

Fledged: a young birds feather have grown and it is ready to leave the nest.

Genus: the division of classification into which a Family is divided and which has one or more species.

Habitat: a place which supplies a birds needs for food, breeding and protection from predators.

Incubates: keeps eggs at a constant temperature until they hatch.

Preening: putting feathers in order.

Primaries: main or outer flight feathers.

Range: Area in which a particular bird is normally found.

Secondaries: middle group of flight feathers attached to the forearm.

Species: a group of animals whose members can breed with each other and produce fertile offspring.

Status: how many of a species exist and whether numbers are increasing or decreasing.

➤ 16. APPENDIX

- Equipment details
- Suppliers; most of these chemical cleaning agents will be readily available your local Veterinary suppliers, Veterinary clinic, bulk stock feed suppliers or can look up Vetafarm www.vetafarm.com.au for other suppliers in your area.
- Drug details
- Material Safety Data Sheets

The following drugs and dose rates have been effective treatments for **roundworm**:

Drug name	Active ingredient	Dose rate
Panacur 2.5	Fenbendazole	1-5mls/litre water 0.1mg/100g
Ivomec	Ivermectin	20mls/litre water 0.25mls of 1:10 diluted mix per 100g
Nilverm, Avitrol	Levamisole	25ml/litre water 0.1ml/100g
Benzelmin, Synanthic, Systamex	Oxfendazole	1-2mls/litre water 0.25ml of 4mg/ml per 100g
Cydectin	Moxidectin	20mls/litre water 0.2ml/100g
Lovitts	Piperazine Dihydrochloride	1ml/10ml water

ANBRF contact Gary Gross
 Uni of Sydney 425 Werombi Rd, Camden NSW 2570 Australia,
 Ph: 02 46550205
gcross@extro.ucc.su.oz.au

- Effective disinfectants that are safe to use by humans and with young birds are; chlorhexidine sold as Aviclenz, Hibiclens, Hibitane or Nolvosan, chloramines sold as Halamid or Halasept and sodium hypochlorite a common form of chlorine used at a 5% dilution rate.
- Hibiclense: antiseptic anti-microbial skin cleanser containing 4% chlorhexidine gluconate.
- Virkon S: broad spectrum disinfectant effective control of viruses, bacteria and fungi.
- Nolvosan: chlorhexidine ,Oxyfresh product
- Lectade: oral rehydration therapy, contains glucose, glycine, electrolytes, either sachets or concentrate, Jurox
- Piperazine solution: controls roundworms
- Pestene: insect powder, active ingredients – 50g/kg sulphur, rotenone 10g/kg Inca (flight) Co Pty Ltd
- Coopex: residual insecticide, 250g/kg permethin Bayer
- Piperazine solution: anthelmintic (roundworms), 172.5g/L piperazine anthydras Inca(flight)Co Pty Ltd 450/l citrate
- Aviclenz: see MSDS
- Bleach: dilute with water ratio 20parts water:1 part bleach
- Lovitt's Whistler Bird Wormer: active constituent Piperazine Dihydrochl Oride 25mg/ml. Treatment for Roundworm *Ascardia* and *Capillaria*. Dosage 1ml/10ml water.
- A suggested general dosage of doxycycline (Psittavet, Vibramycin or Vibravet) is as follows:
 - . 25 – 50mg/kg every 24 hours orally for 45 days.
 - . 10 g/L for in water medication for 45 days.
 - . 75 – 100mg/kg every 7 days by intramuscular injection x 6-8 injections.
 - 100mg/kg for all other parrots.
- The manufacturer of Psittavet Injectable 50mg/ml (Vetafarm) recommends using 0.1ml per 100grams once weekly for 6 – 7 weeks.

MATERIAL SAFETY DATA SHEET**Racumin Rat and Mouse Paste**

Date of Issue: October 15, 2002

1. IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND SUPPLIER

Product name: **Racumin Rat and Mouse Paste**

Other names: None

Product code: 1019820

Recommended use: Prepared rodenticide paste bait for rodent control.

Supplier: Bayer Environmental Science – A Business Group of
Bayer CropScience Pty Ltd ABN 87 000 226 022

Address: 391 - 393 Tooronga Road, East Hawthorn
Victoria 3123, Australia

Telephone: (03) 9248 6888

Facsimile: (03) 9248 6800

Website: www.bayercropscience.com.au

Contact: Technical Manager (03) 9248 6854

Emergency Telephone Number: 1800 033 111 – Orica SH&E Shared Services

2. HAZARDS IDENTIFICATION**HAZARDOUS SUBSTANCE - NON-DANGEROUS GOOD**

Very toxic in contact with skin and if swallowed. Not irritating. Not flammable.

Hazard designation: Hazardous according to criteria of Worksafe Australia

Risk phrases: R27/28 Very toxic in contact with skin and if swallowed
R48/24/25 Toxic: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed

Safety phrases: Not applicable

ADG classification: Not "dangerous goods" for transport by road or rail according to the Australian Code for the Transport of Dangerous Goods by Road and Rail.

SUSDP classification: Schedule 5 (Standard for the Uniform Scheduling of Drugs and Poisons)

3. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredients:	CAS Number:	Concentration (g/kg):
Coumatetralyl	[5836-29-3]	0.375
Dyestuff	-	Very low
Food ingredients	-	Very high
Bitrex bittering agent	[3734-33-6]	Very low
inert ingredients	-	Med

Material Safety Data Sheet - Bleach

Classified as hazardous according to the criteria of Worksafe Australia

Section 01 Identification

MSDS: Rev 2 Date: 06 August 2003
Domestic Trade Name: Bleach
Other Names: Hypochlorite Solution, Bleach Solution, Hypo.
Manufacturers Product Code: None Allocated
UN Number: 1791
Dangerous Goods Class: 8
HAZCHEM Code: 2X
Poison Schedule Number: None Allocated
Use: Bleaching Agent, Disinfectant

Section 2 Physical Description / Properties

Appearance: Clear, green-yellow liquid having a chlorine odour.
 Bleach is strongly corrosive and a moderate oxidising agent.
Boiling Point or Melting Point: 110°C (15% available Chlorine)
Vapour Pressure: Not Available
Specific Gravity: 1.1
Flash Point: Not Available
Flammability Limits: Not Available
Solubility in Water: Aqueous Solution

Section 3 Other Properties

pH of Concentrate: 12 (approximately)

Section 4 Ingredients

Chemical Name:	CAS Number:	Proportion:
Sodium Hypochlorite [NaOCl]	7681-52-9	10% weight / volume
Sodium Hydroxide [NaOH]	1310-73-2	0.8%
Water	-	Remainder

Section 5 Health Effects

Swallowed:	Severe internal irritation due to corrosive effect.
Eye:	Severe irritation and burns.
Skin:	Irritation and burns.
Inhaled:	Irritation of respiratory tract, resulting in coughing and breathing difficulty caused by chlorine fumes.
Chronic:	If condition persists, seek further attention.

Section 6 First Aid

Swallowed:	Wash out mouth with water and give water to drink. Do not induce vomiting.
Eye:	Irrigate immediately with water for 15 minutes and seek medical attention.
Skin:	Wash with large amounts of water. Remove affected clothing and wash underlying skin.
Inhaled:	Remove from exposure. Keep warm and at rest.

Section 6B First Aid Facilities:

Advice to Doctor:	Treat symptomatically.
--------------------------	------------------------

Section 7 Precautions for Use

Exposure Standard:	There are no exposure limits available.
Engineering Controls:	Use in open or well ventilated areas.
Personal Protection:	Wear PVC gloves and chemical goggles. An acid resistant respirator to AS 1716 is recommended if spray mists are produced during use. It is recommended that a shirt with long sleeves and long trousers be worn. Always wash skin and clothing after using this product.
Flammability:	Non-flammable.

Section 8 Safe Handling Information

Storage and Transport:	This product is classified as non dangerous according to the ACTDG. Store in plastic containers in a clean, dry, cool, well ventilated place away from foodstuffs, other oxidising agents and acids. Store and transport in an upright container. Containers must be carefully vented to release any pressure build-up.
Spills and Disposal:	Minimise leak and or contain spills. Collect as much of the spillage as possible. Keep pH of the remaining spilled solution above 7.0 and dilute it with large amounts of



3 Bye St, Wagga Wagga NSW Australia
 Telephone (02) 6925 6222 Fax (02) 6925 6333
 Email: vetafarm@vetafarm.com.au
 Internet: <http://www.vetafarm.com.au>
 International Phone 61 2 6925 6222 Fax 61 2 6925 6333

MATERIAL SAFETY DATA SHEET

PSITTAVET

Date of Issue: 5th February 2009

Issue 6

IDENTIFICATION

Product Name:	PSITTAVET	Hazchem Code:	None Issued
Other Name:	None	Dangerous Goods Class and Sub-risk	None Issued
Manufacturers Code:	B-40008	Poison Schedule:	S4
UN Number:	None Issued	Packaging Group:	None Issued

Use: Treatment of psittacosis/ornithosis (caused by *Chlamydia psittaci*) and other susceptible bacterial diseases in caged and aviary birds and pigeons by drinking water medication.

HAZARD IDENTIFICATION

Hazardous according to criteria of NOHSC/ASCC

INGREDIENTS

Chemical Entity:	CAS No:	Proportion:
Doxycycline hydrochloride	24390-14-5	4%
Ingredients Determined Not to be Hazardous	N/a	96 %

FIRST AID MEASURES

If poisoning occurs, contact a doctor or Poisons Information Centre. Phone Australia 131 126, New Zealand 0800 764 766.

FIRE FIGHTING MEASURES


Non-flammable

ACCIDENTAL RELEASE MEASURES

Do not contaminate streams, rivers or waterways with the chemical or used containers.

HANDLING AND STORAGE

Store below 30°C (Room temperature)

		3 Bye St, Wagga Wagga NSW Australia Telephone (02) 6933 0400 Fax (02) 6925 6333 Email: vetafarm@vetafarm.com.au Internet: http://www.vetafarm.com.au International Phone 61 2 6933 0400 Fax 61 2 6925 6333	
MATERIAL SAFETY DATA SHEET			
AVI CARE CONCENTRATE			
Date of Issue: 5 th February 2009		Issue 9	
PRODUCT IDENTIFICATION			
Product Name:	Avi care Concentrate	Hazchem Code:	None Issued
Other Name:	None	Dangerous Goods Class and Sub-risk	None Issued
Manufacturers Code:	B-40002	Poison Schedule:	S5
UN Number:	None Issued	Packaging Group:	None Issued
<p>Use: Avian Disinfectant/Cleanser is used for the disinfection of all companion animal environment including cages, pens, equipment and food containers.</p>			
HAZARD IDENTIFICATION			
Hazardous according to criteria of NOHSC/ASCC Xi Irritant Risk Phrases: R36/38 Irritating to eyes and skin. Safety Phrases: S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28 After contact with skin, wash immediately with plenty of water. S36/37/39 Wear suitable protective clothing, gloves and eye/face protection. S45 In case of accident or if you feel unwell, seek medical advice immediately and show the label of this product S61 Avoid release to the environment. Refer to special instructions/Material Safety Data Sheets.			
INGREDIENTS			
Chemical Entity:	CAS No:	Proportion:	
Benzalkonium Chloride	8001-54-5	5%	
Sulfamic acid	5329-14-6	2.5%	
Ingredients Determined Not to be Hazardous	Not Applicable	92.5%	

FIRST AID MEASURES	
If poisoning occurs, contact a doctor or Poisons Information Centre. Phone Australia 131 126, New Zealand 0800 764 766.	
If swallowed, do NOT induce vomiting. Give a glass of water.	
If skin contact occurs, remove contaminated clothing and wash skin thoroughly.	
If in eyes, hold eyes open, flood with water for at least 15 minutes and see a doctor.	
FIRE FIGHTING MEASURES	
Non-flammable	
ACCIDENTAL RELEASE MEASURES	
Do not contaminate streams, rivers or waterways with the chemical or used containers.	
HANDLING AND STORAGE	
Store below 30°C (Room temperature)	
EXPOSURE CONTROLS/PERSONAL PROTECTION	
Will damage eyes and will irritate the skin. Repeated exposure may cause allergic disorders.	
Avoid contact with eyes and skin when opening the container, preparing the solution and wear cotton overalls, buttoned to the neck and wrist and a washable hat, elbow length PVC gloves and goggles. When using the spray wear elbow-length PVC gloves and goggles.	
If product in eyes, wash it out immediately with water.	
After each day's use, wash gloves, goggles and contaminated clothing.	
PHYSICAL DESCRIPTION/PROPERTIES:	
Appearance:	Clear, pale green liquid
Odour:	Lemon
pH (1% soln)	5.0 – 6.0
Boiling point (°C)	Not available
Solubility in Water:	Miscible in all proportions
Specific Gravity:	1.0 – 1.05
STABILITY AND REACTIVITY	
Product is stable under recommended conditions of use and storage.	
TOXICOLOGICAL INFORMATION	
This product is contraindicated for use on equipment and housing related to fish and aquatic organisms.	
ECOLOGICAL INFORMATION	
Do not contaminate streams, rivers or waterways with the chemical or used containers – toxic to fish and aquatic organisms.	
DISPOSAL CONSIDERATIONS	
Dispose of empty container by wrapping in paper and putting in garbage	
TRANSPORT INFORMATION	
No special precautions for transportation.	

EXPOSURE CONTROLS/PERSONAL PROTECTION	
Dust mask, adequate ventilation is recommended.	
PHYSICAL DESCRIPTION/PROPERTIES:	
Appearance:	Fine, granular yellow/green powder.
Odour:	Odourless
pH (1% soln)	2.29 – 4.29
Boiling point (°C)	N/A
Solubility in Water:	Complete in 1% solution.
Specific Gravity:	N/A
STABILITY AND REACTIVITY	
Product is stable under recommended conditions of use and storage.	
TOXICOLOGICAL INFORMATION	
Not available	
ECOLOGICAL INFORMATION	
Not available	
DISPOSAL CONSIDERATIONS	
Dispose of empty container by wrapping in paper and putting in garbage	
TRANSPORT INFORMATION	
No special precautions for transportation.	
REGULATORY INFORMATION	
This product is registered for use in Australia by the APVMA. Approval Number 38819	
OTHER INFORMATION	
Contact	Vetafarm Pty Ltd Head Office: (02) 6933 0400 (b/h)

END OF MSDS